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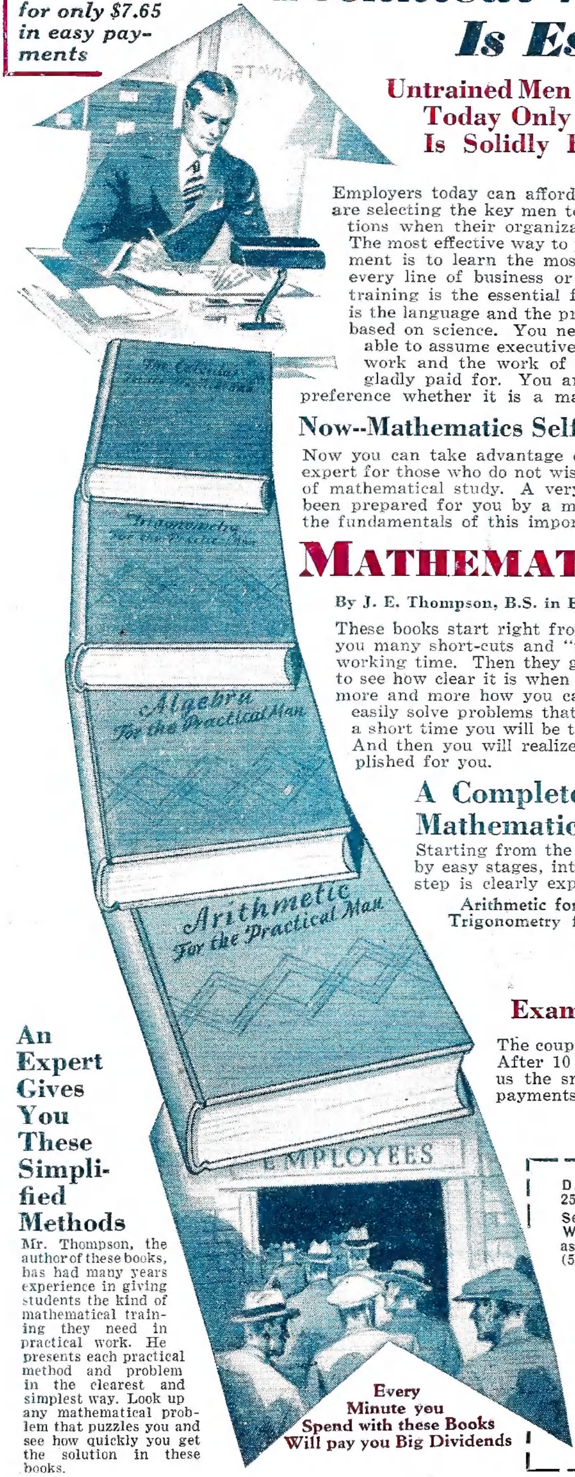
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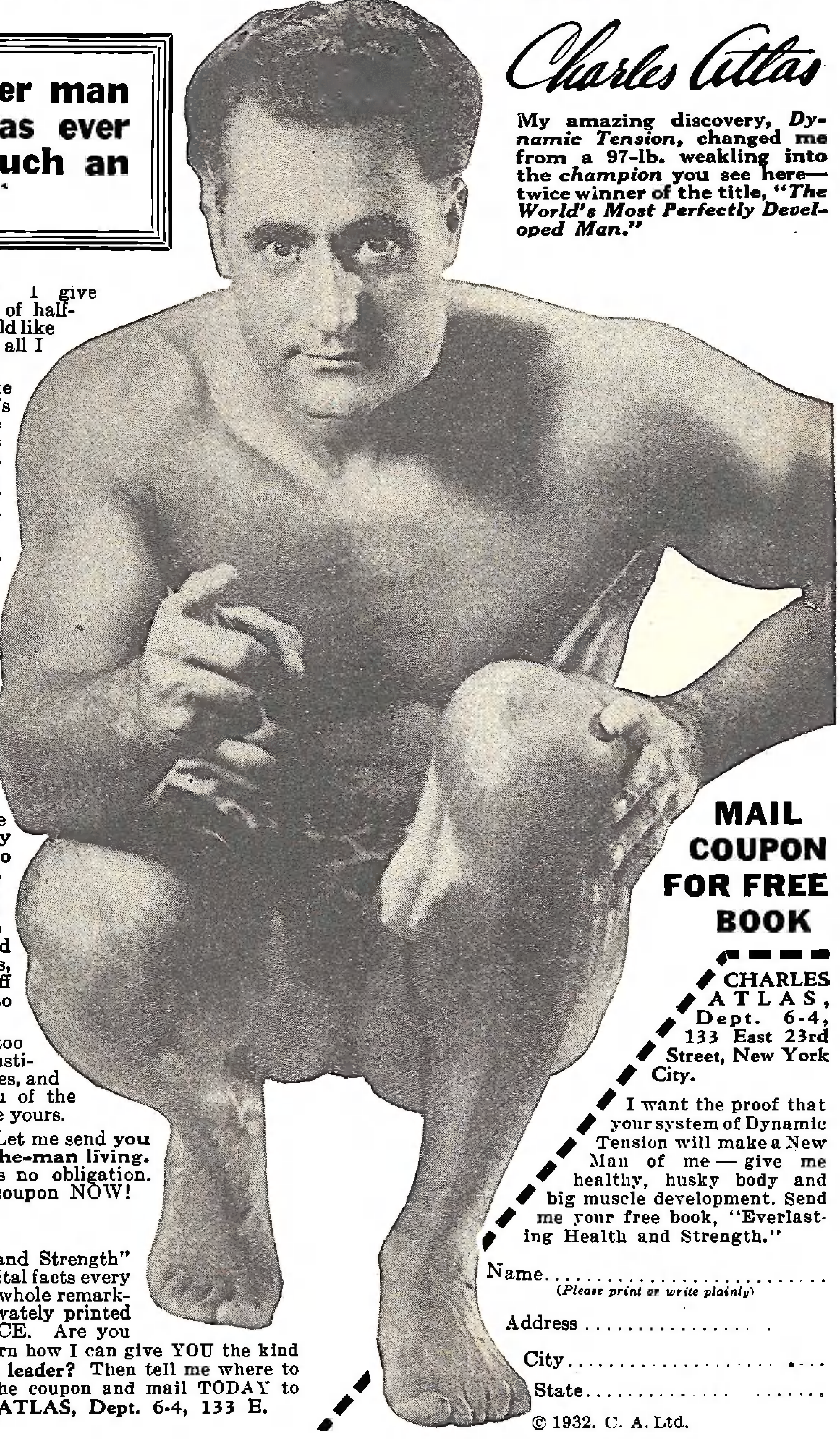

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April, 1933
VOLUME IX
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MODERN MECHANIX AND INVENTIONS

Donald G. Cooley
EDITOR

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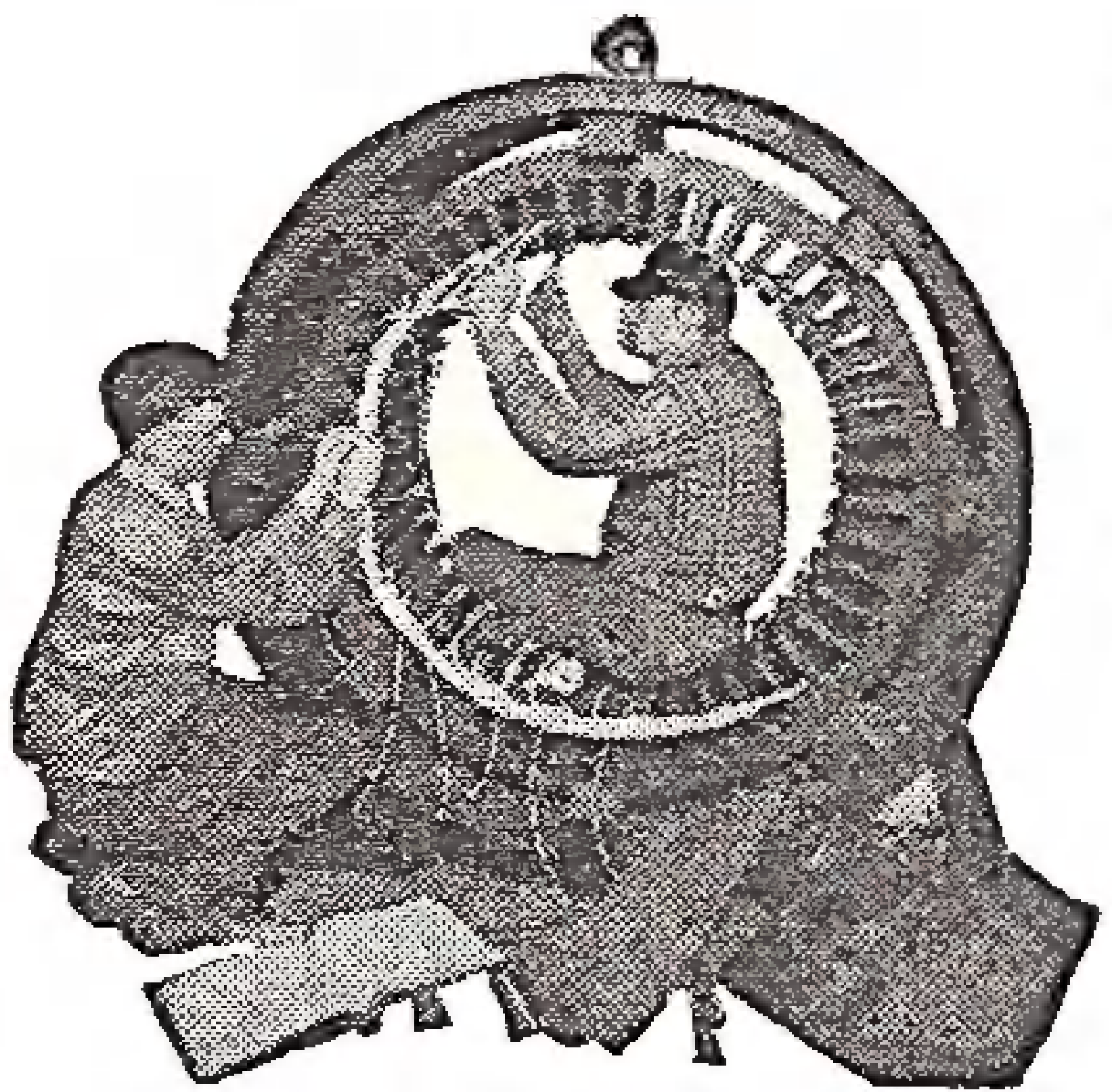

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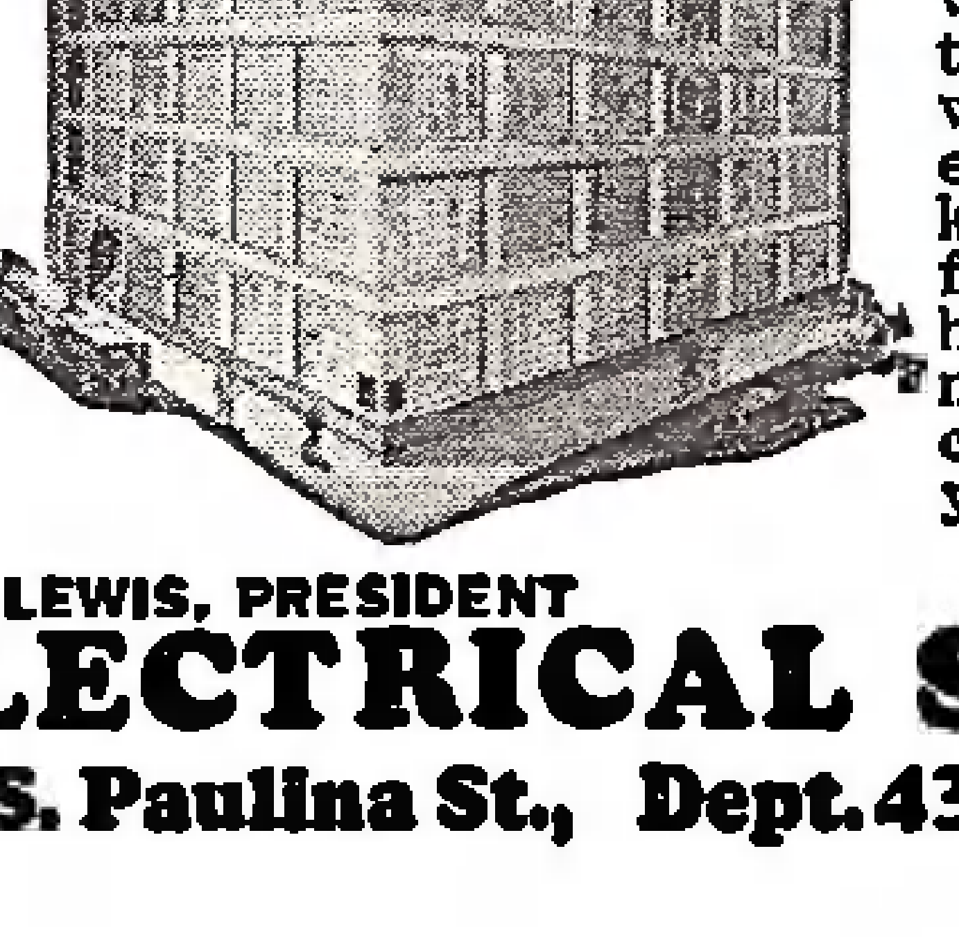

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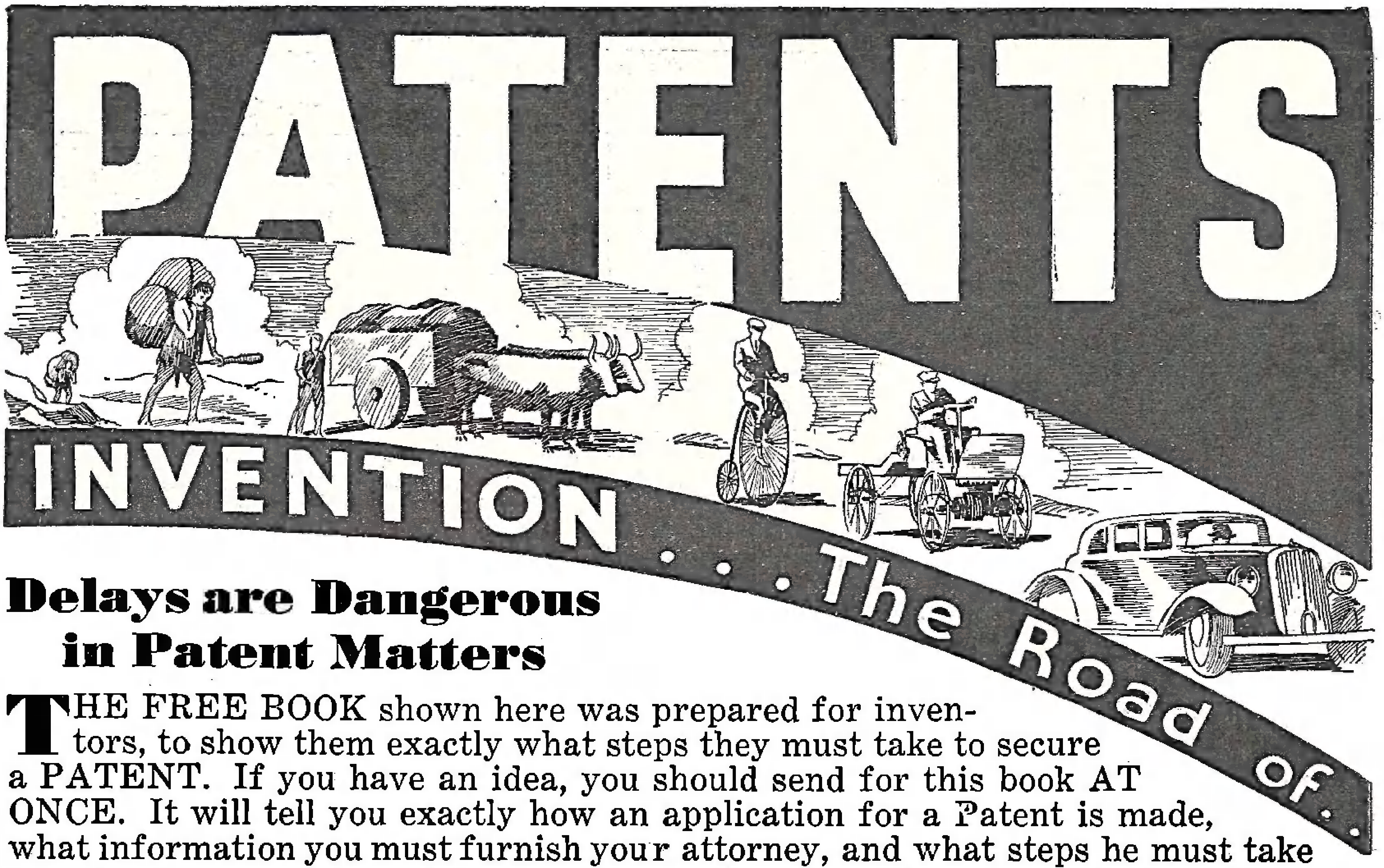

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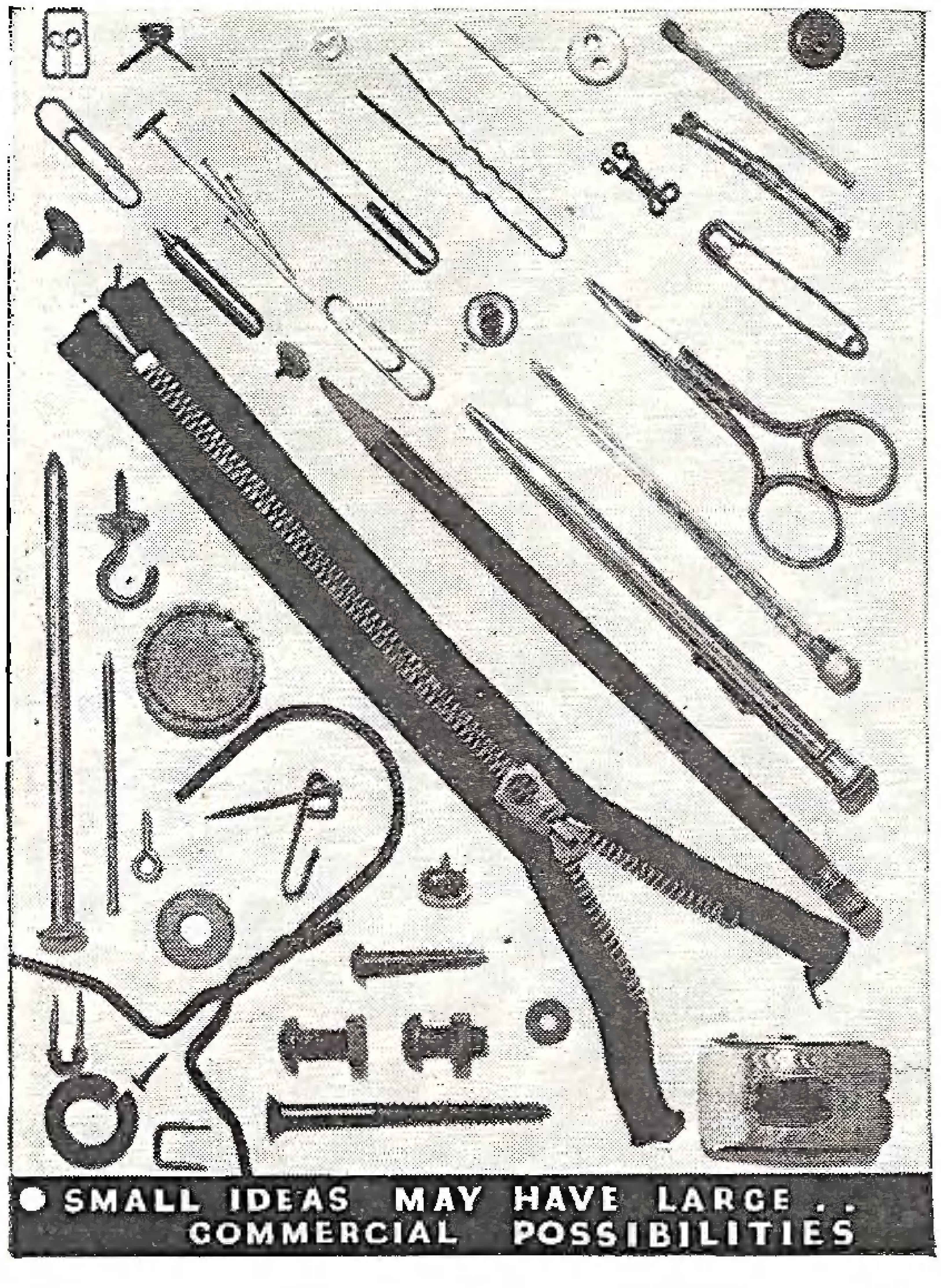
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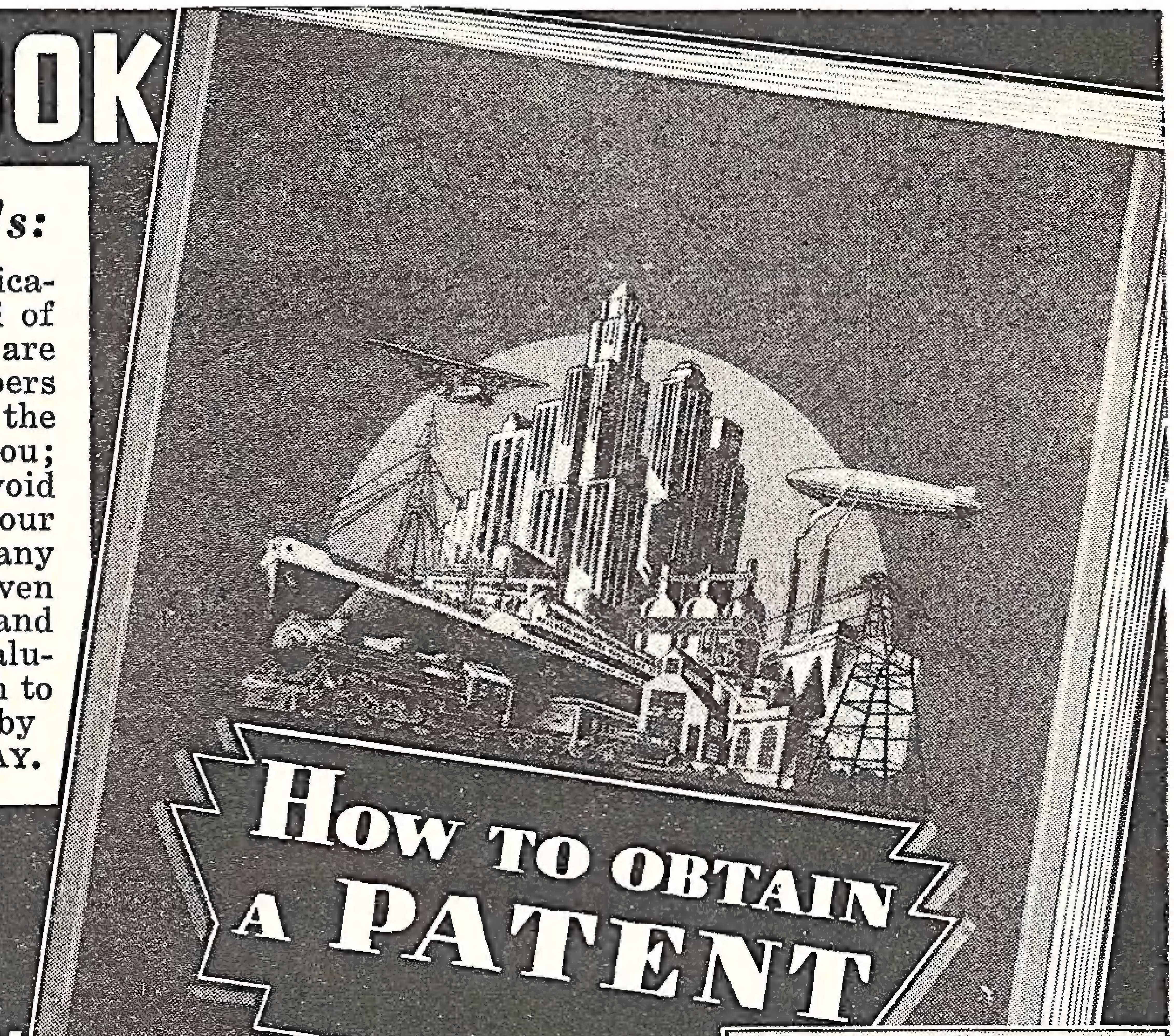
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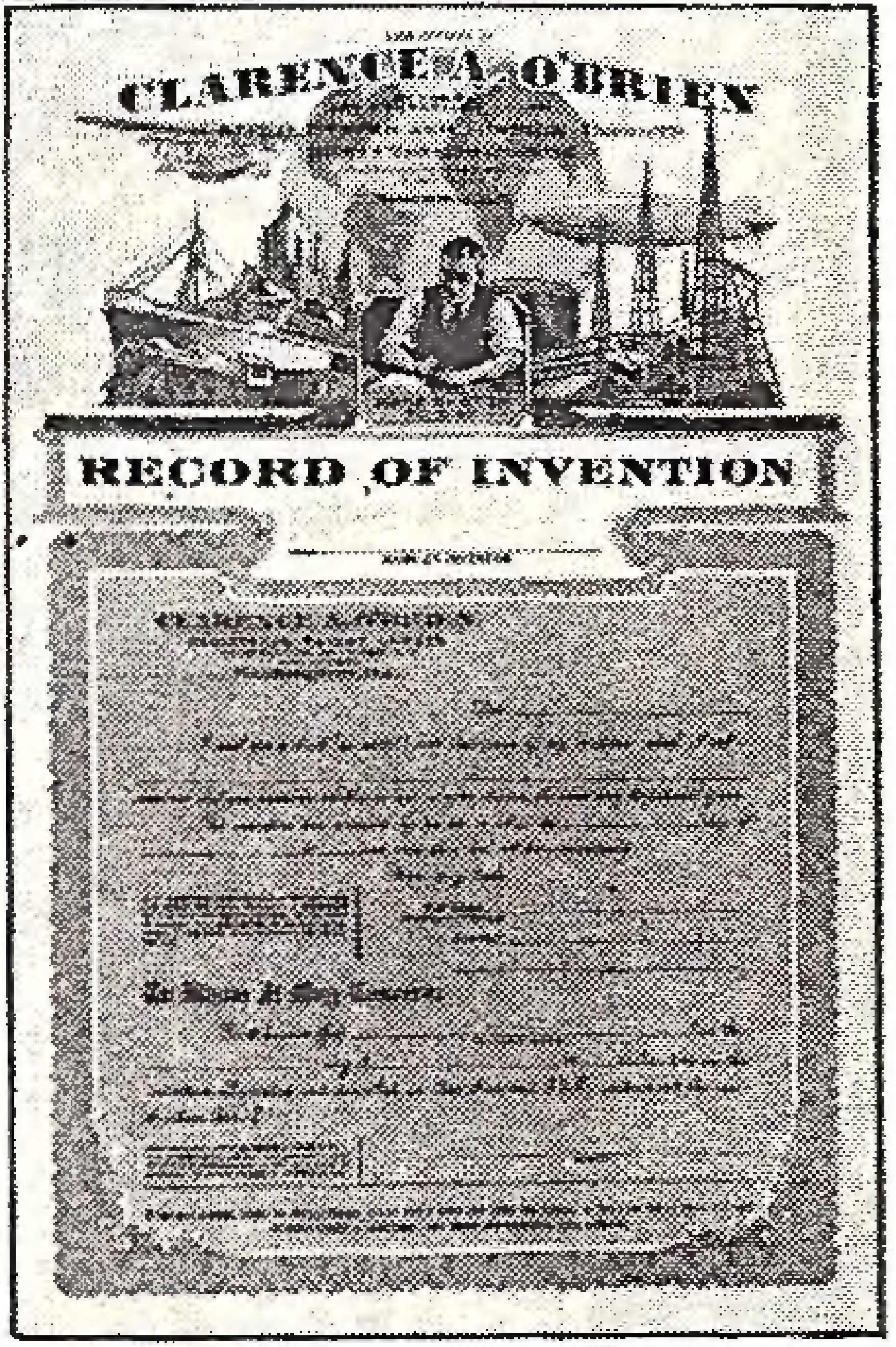
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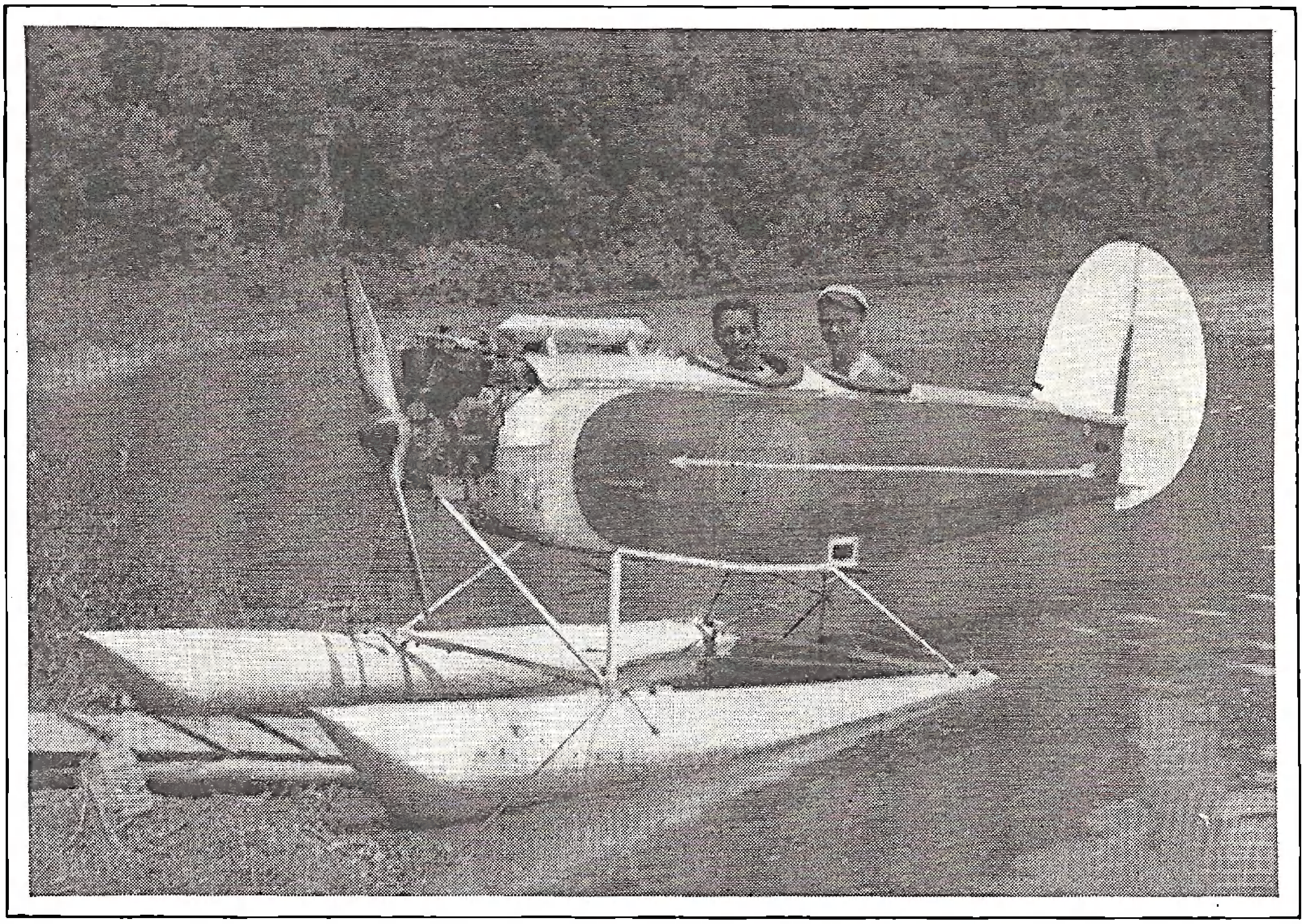


J. Alex Steel, of Tyrone, Penna., built this water wagon or straddle bug with the aid of help from a good friend. They have had a lot of fun, if not much speed, from the rig and are here shown in a typical pose for navigators of water straddlers—and a neat job the ship is. New pontoons will soon be added. Round ones throw too much water.

Andy's Shop Mail Box

The popularity of the Greasemonk's line of guff has insistently made itself felt in our editorial offices to the point where it is necessary to accord Andy a two-page opener for his singular monthly expression.

I BET a guy last night five bucks that a duck has got a gizzard. He swore up and down that a duck has a stomach, like a mammal.

The bet is on. I says put up or shut up, so we buy a duck. I hated to murder the pretty thing, but gizzards are gizzards and so we rigged up a high tension electric chair for the duck over at Sam Wing's experiment shack and it was all over with one quack.

The duck has a gizzard.

I have five bucks and a three dollar duck, so I'm that much richer today.

Only woodpeckers have stomachs.

* * *

Even a downtrodden greasemonk can be right once in a while. And I usually am.

* * *

Say, boys, (forgivin' the above pat, please) how do you like it that I'm getting a double page spread to this bucket of tripe?

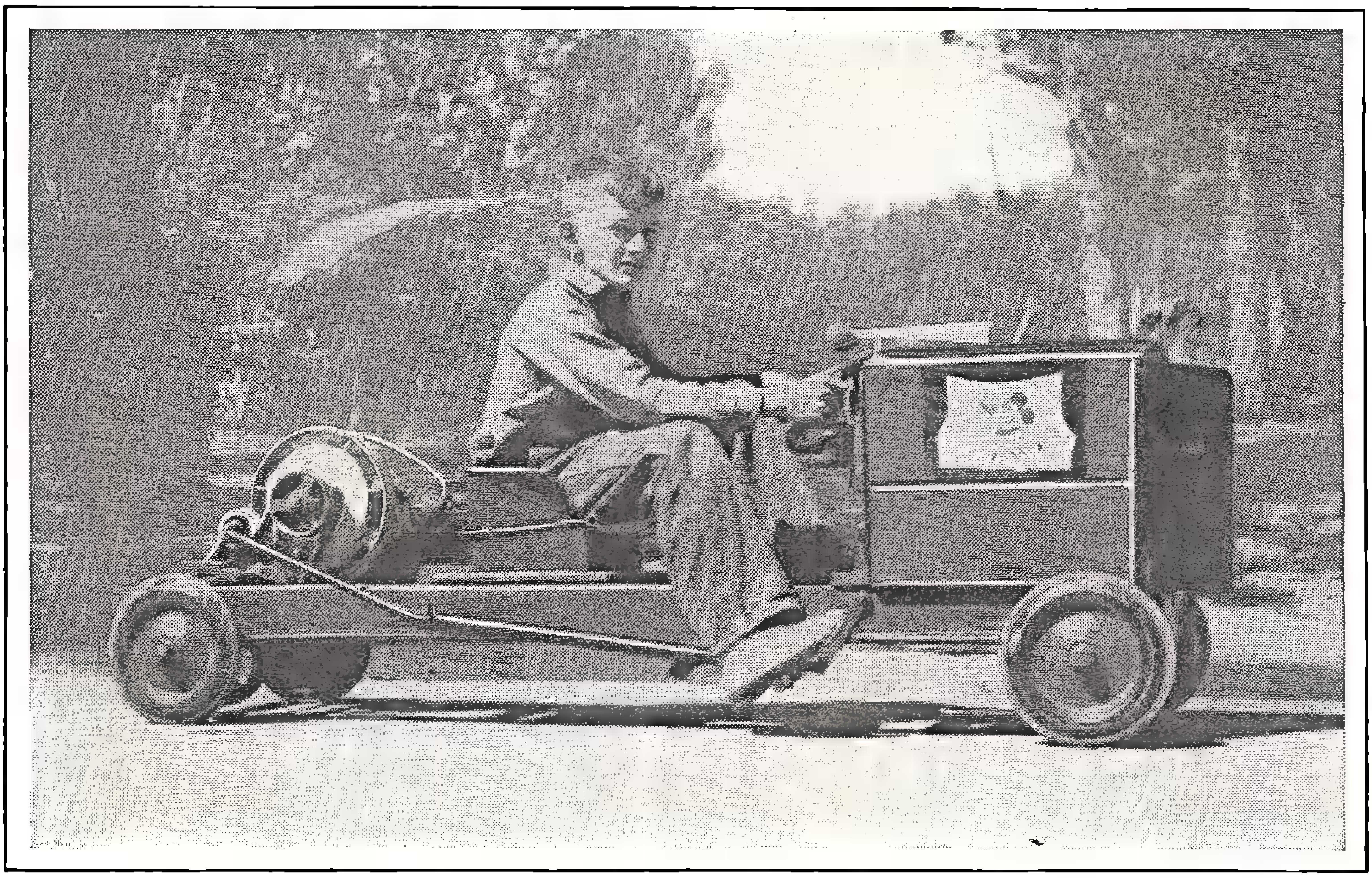
Every month since the old book first went to press I've been peckin' and punchin' out rambling thoughts as the months wear on, and after a while each month what has been written is collected and slammed into the sheet like so much lead pipe.

There was a recent editorial overhaul when the book went to fifteen bat boots per copy, and the powers that be said in effect to cut out the big how-to-builds (too much of them) and to run smaller stuff to appeal to everybody. And to let that guy Andy have more rope, say give him a double opener. Geez, he can write.

* * *

That is all the self uplift I'm allowing myself this issue. But now we have more room, and have become a feature instead of an interesting personal guff-line used to hang reader reactions on.

But with success, do I change? Not me, bro. I'll still sleep in my cot alongside the draughty hangar wall at Robbinsdale, where we have bigger and better crickets, and I'll still wash my one and only flannel shirt in water I haul myself from the old strongarm pump, on account of with all this success I might get a pay cut. Democratic, I am.



Seph Holmes, Phoenix, Ariz. lad shown with his scrubbin' machine automobile, which can do 25 miles an hour with the wind conditions just right. Its cost was only $12.00 complete. Wheels and tires are of the coaster wagon variety.

Really I can't afford to change. I'm taking up drawing—(drawing paychecks in advance). But we're happy, things is somewhat secure, and with spring comin' up over the south forty there ain't much to squawk about.

Here is a letter from Elmwood Park, Illinois, where many are called but few get up.

> **Att. Herr Andy von Grease Monk.**
> **Gentlemen.**
>
> **Read every copy of M-M since it was born and would like to build a plane, but you know the /?:"—() !!!!! inspectors.**
>
> **Why don't you run a "HOW TO BUILD" a Crawford Power glider, you know this is an A.T.C.**
>
> **A reply to this will be appreciated as to whether or not there is a possibility of ever publishing plans for the above, or if there is a reason for not doing so.**
>
> **Yours truly,**
> **A. G. Brandeau,**
> **7935 Cressett Drive,**
> **Elmwood Park, Ill.**
>
> **P. S. Stamped addressed envelope for Aerio Postale enclosed.**

* * *

By the way, boys, Sam Wing asks me to tell you that his pet, the Packmag, will not be put out until later in the year. As magazines we all live under one roof at this publishing house, and the powers that be, well satisfied from their profit-point-of-view that the Packmag is sure-fire, are holding off until later, feeling that the stands are over-magazined for the summer.

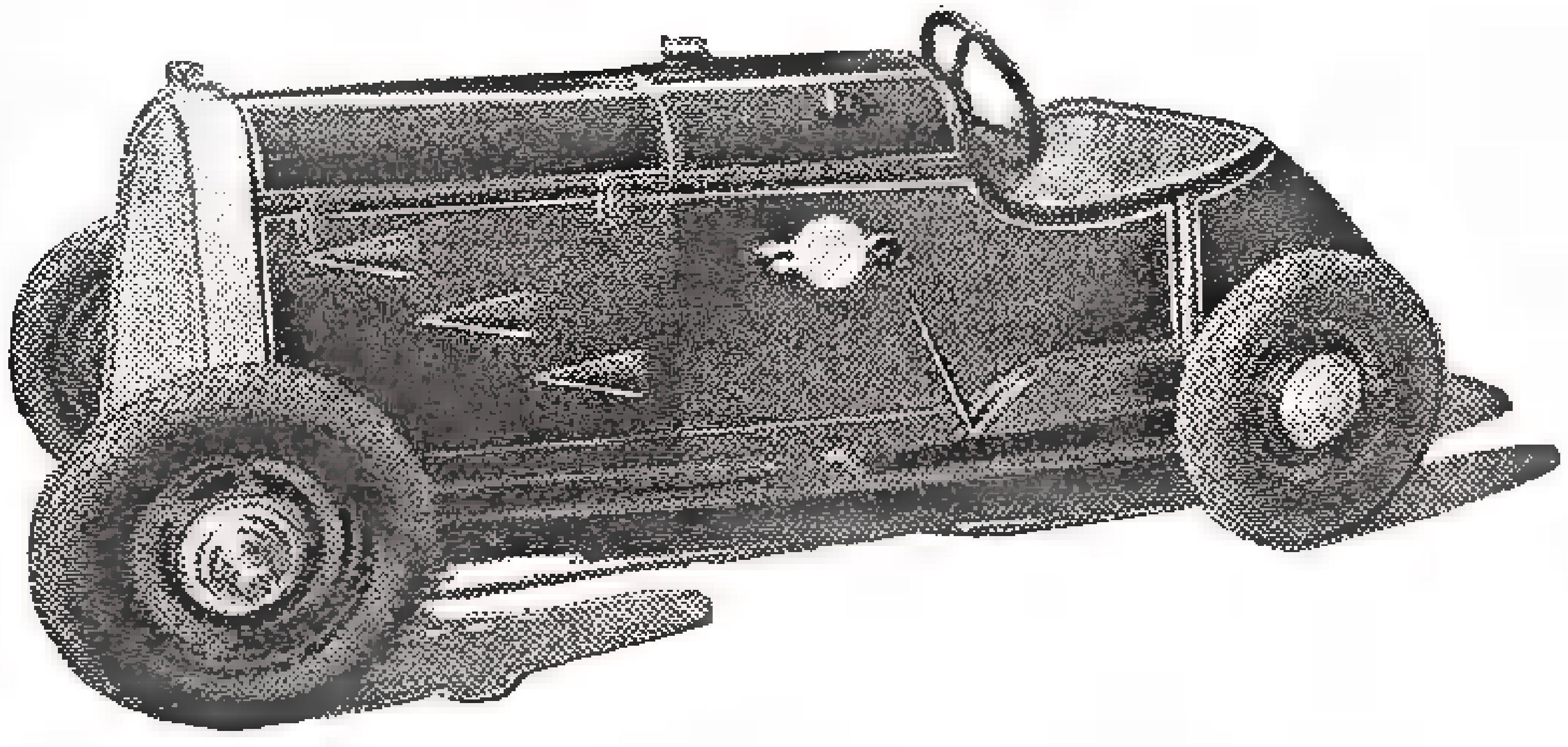
* * *

That gives me a chance to get in some good licks while Sam is doin' some of his beloved researchin'.

Incidentally he turns over to me a letter from a gent in Dallas:

> **Dallas, Texas.**
>
> **Mr. Wing, Dear Sir:**
>
> **Have just been reading issue No. 4 of the "Packmag."**
>
> **Being like thousands of other readers, I could hardly wait to get it.**
>
> **My opinion of your magazine is, to leave it like the 4th issue, as it is as near perfect as any reader could ask for.**
>
> **I had been working on my midget racer, the "Flying Mare" before I bought your issue No. 1.**
>
> **But, I hadn't finished it so, after all, it gave me some great ideas. Thanks to you all.**
>
> **The results of months of labor were very good. It takes lots of spare time, but when you've finished, it's well worth it.**
>
> **You fellows are to be congratulated, for your "Experiment Station" turns out some wonderful work. Such models and plans that give joy and pleasure to thousands of boys all over the country.**
>
> **I firmly believe that the "midget car" in this issue is the cheapest that ever could be built,**

(Continued on page 12)



Roy Hunnicutt, of Dallas, Texas, built this sweet little doodle bug from adaptations. Her name is "Flying Mare."

"The Boss Was Stumped"

"HE WAS trying to figure out a way to speed up the machines. He was stumped and I asked him if he would let me try my hand.

" 'Go ahead,' he said, 'but I don't believe you can help much. Looks like an outside job to me.'

"So I started right in and pretty soon I had the whole thing worked out. The boss was watching me.

" 'How did you learn all that?' he asked in that quiet way of his. And then I told him I'd been studying at home nights through the International Correspondence Schools.

"He called me in his office a few weeks later and said he was going to make me foreman and increase my salary.

" 'Keep on studying,' he told me, 'and you'll get another promotion soon. You can't beat those International Correspondence Schools text-books for good, sound, practical knowledge.' "

That's a true story of what spare-time study has done for just one man. Why don't *you* take up a home-study course with the International Correspondence Schools and prepare yourself to earn more money? At least get the facts.

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If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

ANDY'S SHOP MAIL BOX

(Continued from page 11)

and make as neat a job as you fellows have. It's certainly complete in every way.

Am sending you a photo of the "Flying Mare" to publish if you wish, and also a snapshot for Mr. Winslow's own private collection.

It has a "Harley" twin motorcycle motor. And am able to get 70 miles per, out of her.

Lots of pains has been taken, and its as much as a factory job in every respect.

The gas tank is enclosed in the cowl, and the oil tank under the hood. The gear lever extends from the dash board like on a Cord.

It is a two seater, the chain drive separating the two seats, with of course, a housing over it.

The rear sprocket is welded on to the axle. The axle being covered with a Model T housing.

All switches and the oil pump are on the dash, which I arranged evenly and neatly. Disc wheels, which also were special made, carry size 20x4 Goodyear Airplane Tire.

Outside brake lever can either be pushed down, or pulled back, to be affected.

I have a 4 inch clearing off the ground, which I have found to be plenty.

It is painted a cardinal red, with cream colored wheels. The axles and brace-rods being black.

The slanting screen in front gives it a very attractive streamlined effect.

This little car is a big sensation wherever I go. That's where the fun comes in.

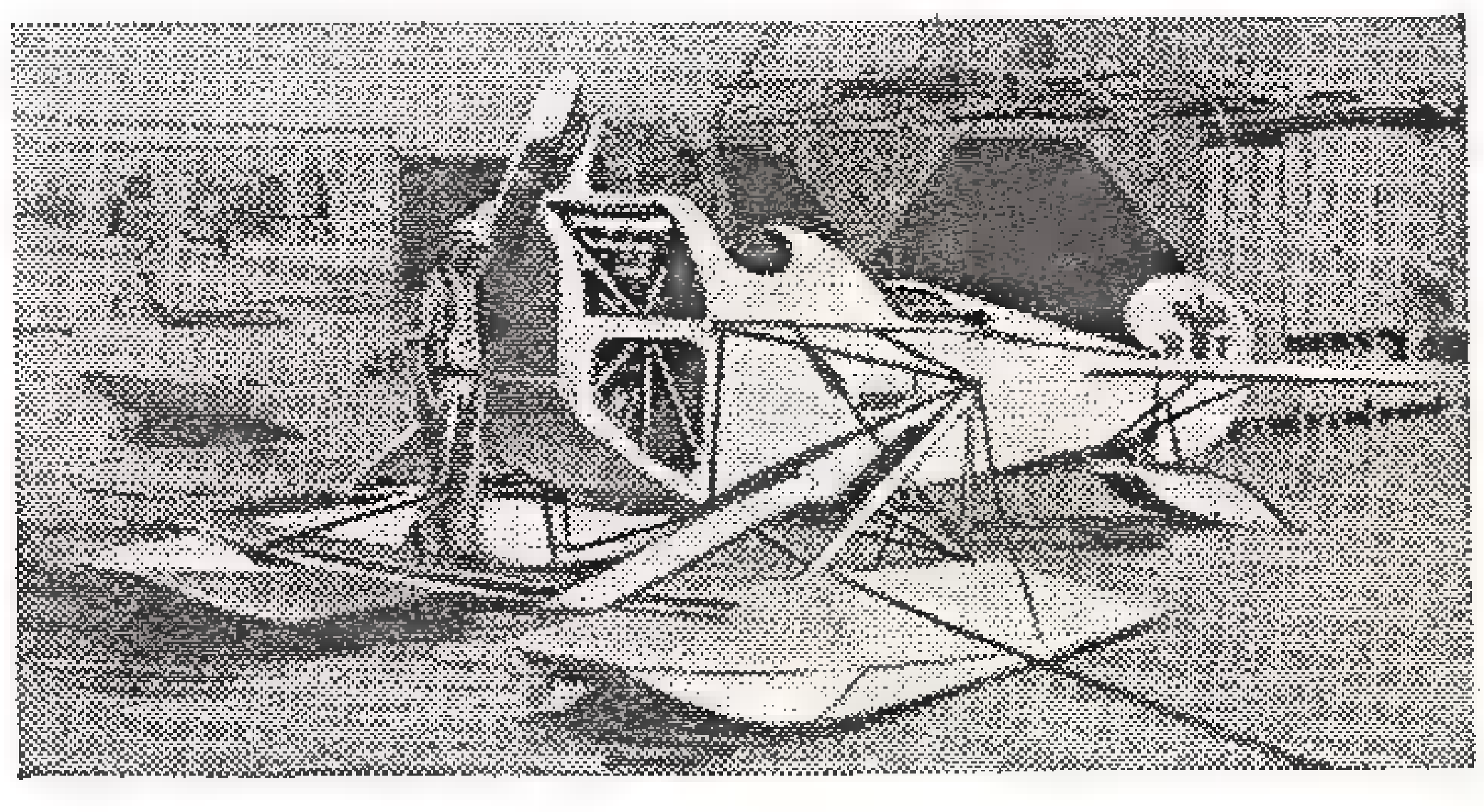
I have my battery under the driver's seat, and a compartment for tools under the other.

I sincerely think I can claim the honors of having the fastest and neatest little job in the Southwest.

The only one I've ever seen or heard of that could compete with it, was the $2,000 job, that you published I believe, in the second issue.

Wishing each and everyone of you a world of success, in anything you undertake to do, and here's to a monthly Packmag.

Roy Hunnicutt,
615 So. Fitzhugh,
Dallas, Tex.



A war time member of the British Royal Engineers helped build this water-glisseur. Read what he says about it, pals.

Still they keep coming. Here is an unusual letter and pix from a man who was in the thick of things when a lot of us were soiling our knee pants. Attend ye:

(Continued on page 16)

George F. Jowett

"CHAMPION · OF CHAMPIONS"

BUILDS MEN LIKE THESE!

More than 10,000 men have taken my course in Physical Instruction . think of it . 10,000 men who have gained big, developed muscles, broad chests and strong legs by spending just a few minutes each day following my instructions. It makes me feel mighty proud to think that I am responsible for the physical fitness of this vast army!

Many of these men were sickly boys when they first came to me, too weak to raise their fists . TODAY they take their place with the many thousands who have doubled their strength and are proud of their prowess!

Many of my pupils, a few of whom are shown here, have won fame as Strength Athletes—winning great honors at the Olympic Games!

WHAT ABOUT YOU?—Do YOU know the courage, strength and health that comes with physical development? I am sure you too would like to add 2 inches to each of your biceps 3 inches to your chest—and have big muscular arms, a broad, powerful back, and legs that will be columns of power for speed and endurance. Give me 15 minutes a day and I will do just that. I will give you a he-man's physique that men will respect and women admire!

Read my famous guarantee that is unqualifiedly given to every pupil who enrolls for my course.

»» I Guarantee to Add at Least . . .

3 INCHES TO YOUR CHEST 2 INCHES TO YOUR BICEPS

. *or it won't cost you one cent!* Signed: GEORGE F. JOWETT

(You are the sole judge—can anything be fairer than that?)

All I want to do is to get you started on my secret method of muscle building! But once you've started, it's easy, for when you see your muscles growing bigger and stronger every day—when you feel yourself getting more pep every day—when you get up in the morning feeling like a million dollars—you'll thank me for all I have done for you!

Don't wait any longer, get going *NOW*—Try one of my test courses first—it will give you the big URGE—

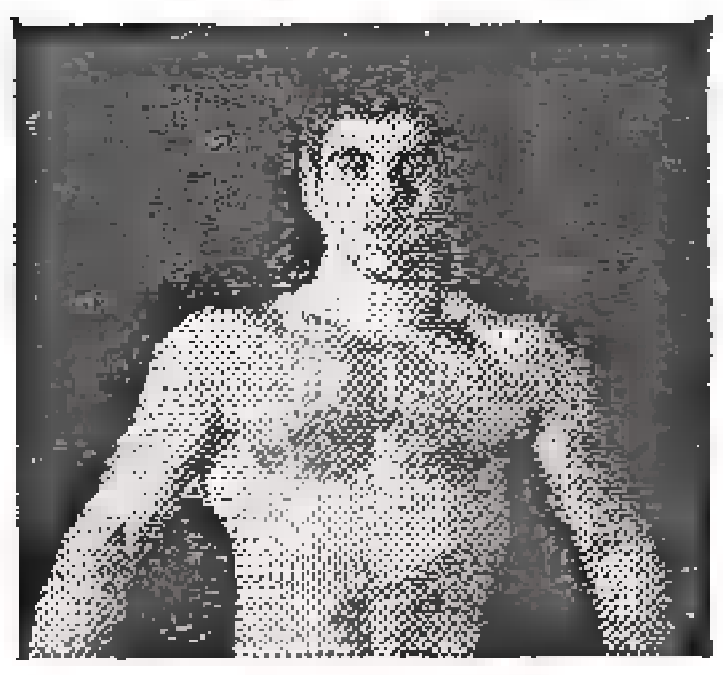
Send for "Moulding a Mighty Arm" a Complete Course for only 25c

It will be a revelation to you. You can't make a mistake The guaranty of the strongest armed man in the world stands behind this course. I give you all the secrets of strength illustrated and explained as you like them. You, too, can get an unbreakable grip of steel and a Herculean arm. Mail your order now while you can still get this course at my introductory price of 25c.

I will not limit you to the arm, try any one of my test courses at 25c. Or, try all six of them for only $1.00.

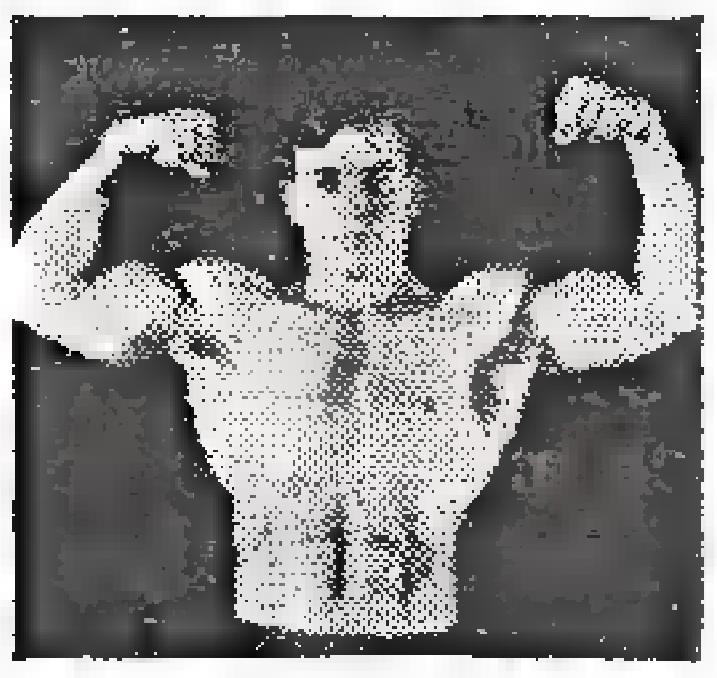
DICK BACHTELL

For 5-years National light-weight Champion! The only man in America to do more than his body weight in the [illegible] hand snatch!



JOE MILLER

Joe Miller is a "natural" He holds many records on Olympic lifts He has "jerked" 290 lbs. and "cleaned" [illegible] 300!



BILL GOOD

First American regardless of body weight to exceed heavy-weight totals on the 3 Olympic lifts, 311 lbs. with two hand "clean and jerk"!

WALLY ZAGURSKI

He [illegible] of the country's best weight-lifters. Member of the Olympic team and holds many weight-lifting records

ART LEVAN

The first American to emulate his teacher, George F. Jowett, and lift double his body weight [illegible] band "jerk"!

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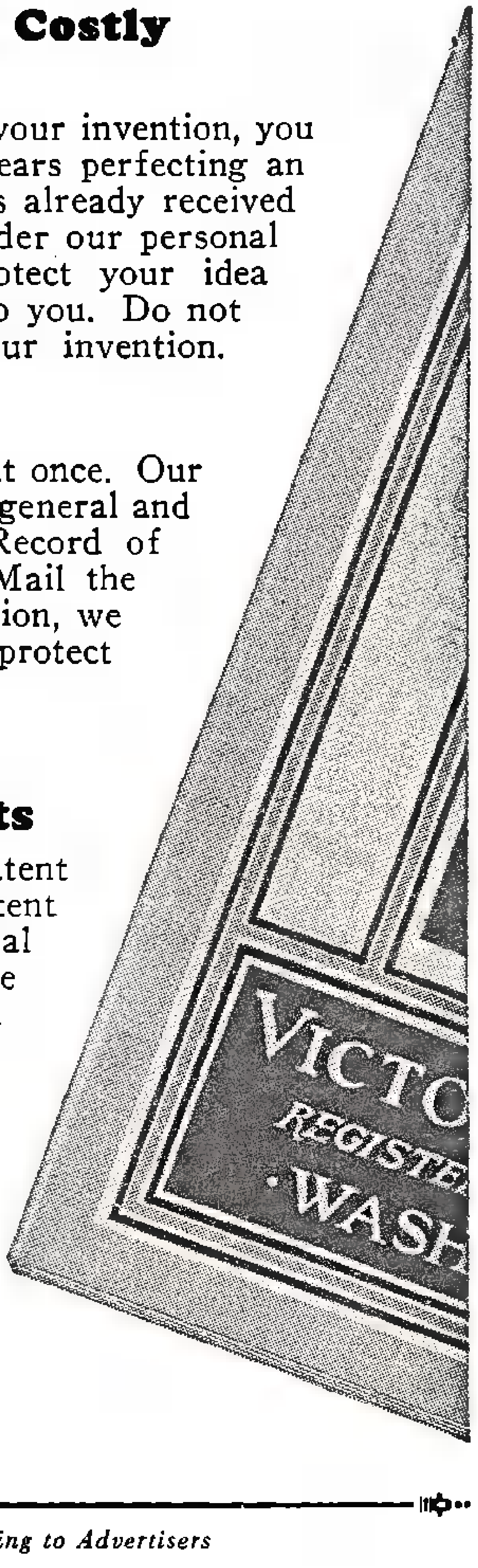

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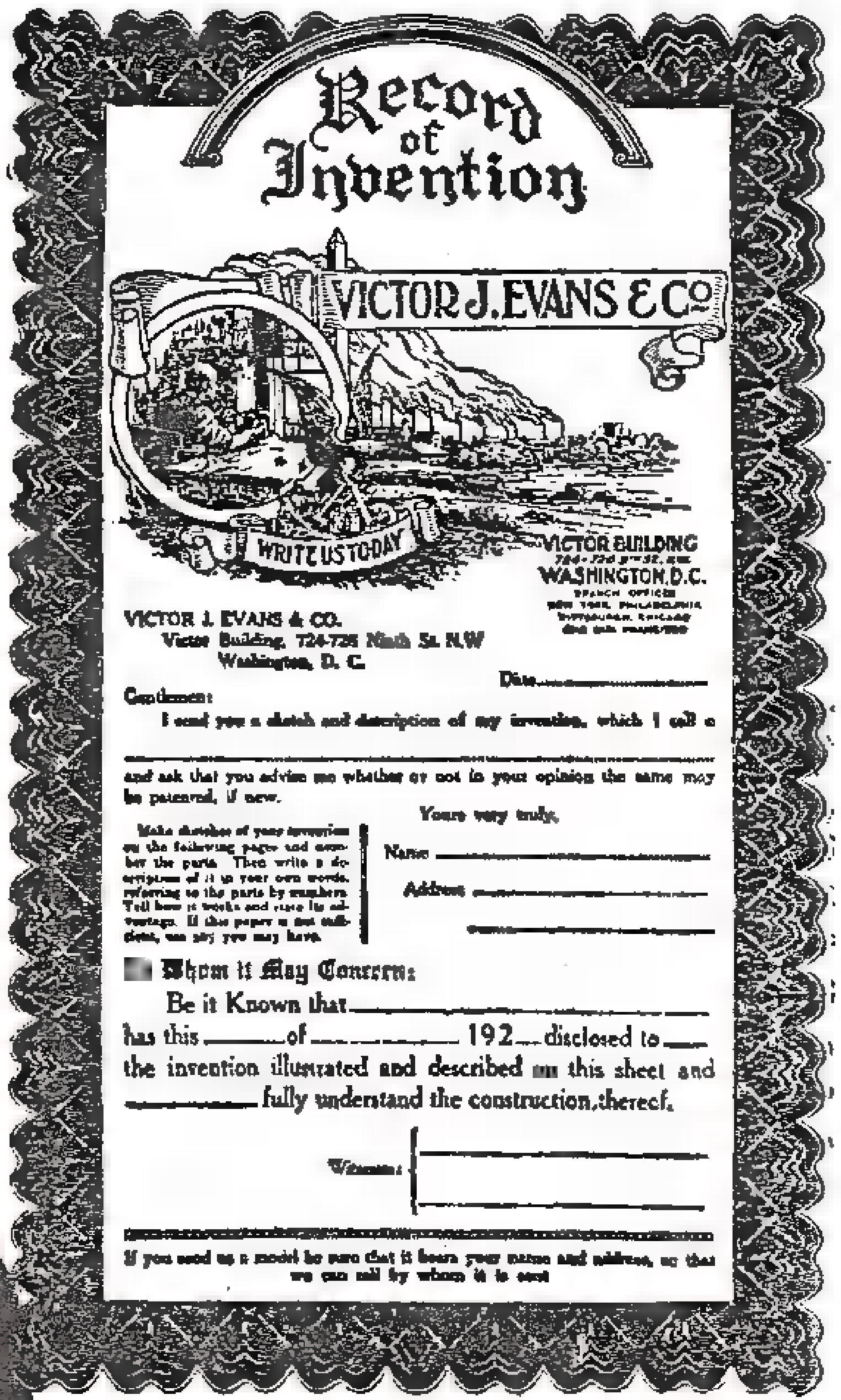

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and ask that you advise me whether or not in your opinion the same may be patented, if new.

Yours very truly,

Make sketches of your invention on the following pages and number the parts. Then write a description of it in your own words, referring to the parts by numbers. Tell how it works and state its advantages. If this paper is not sufficient, use any you may have.

Name

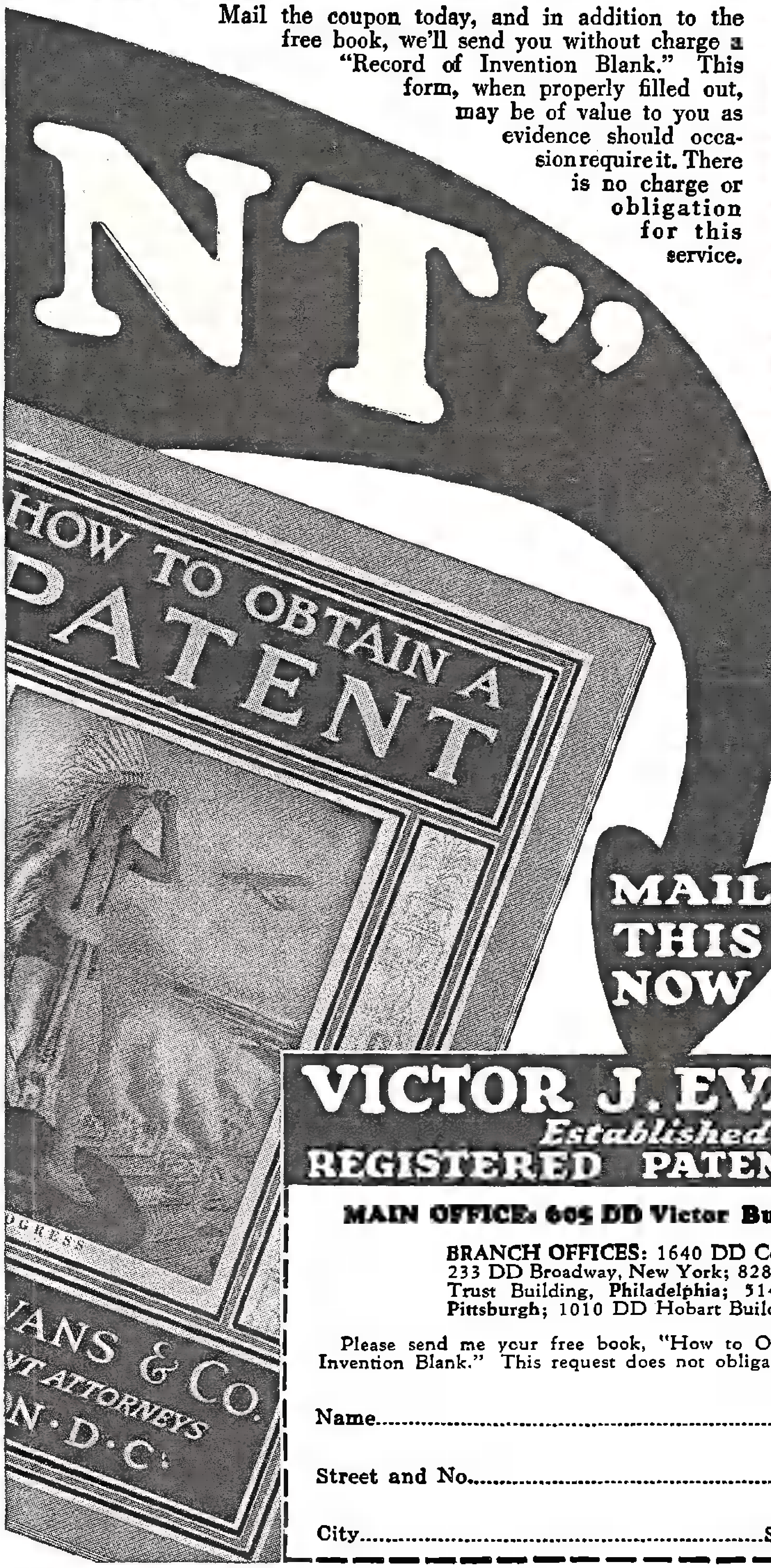
Address

To Whom it May Concern:

Be it Known that ______ has this ______ of ______ 192__ disclosed to ______ the invention illustrated and described on this sheet and ______ fully understand the construction thereof.

Witness:

If you send us a model be sure that it bears your name and address, so that we can tell by whom it is sent



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PLASTIC WOOD
Handles Like Putty—Hardens Into Wood

ANDY'S SHOP MAIL BOX

(Continued from page 12)

5124 Kinzie St.
Chicago, Ill.

Dear Sir:

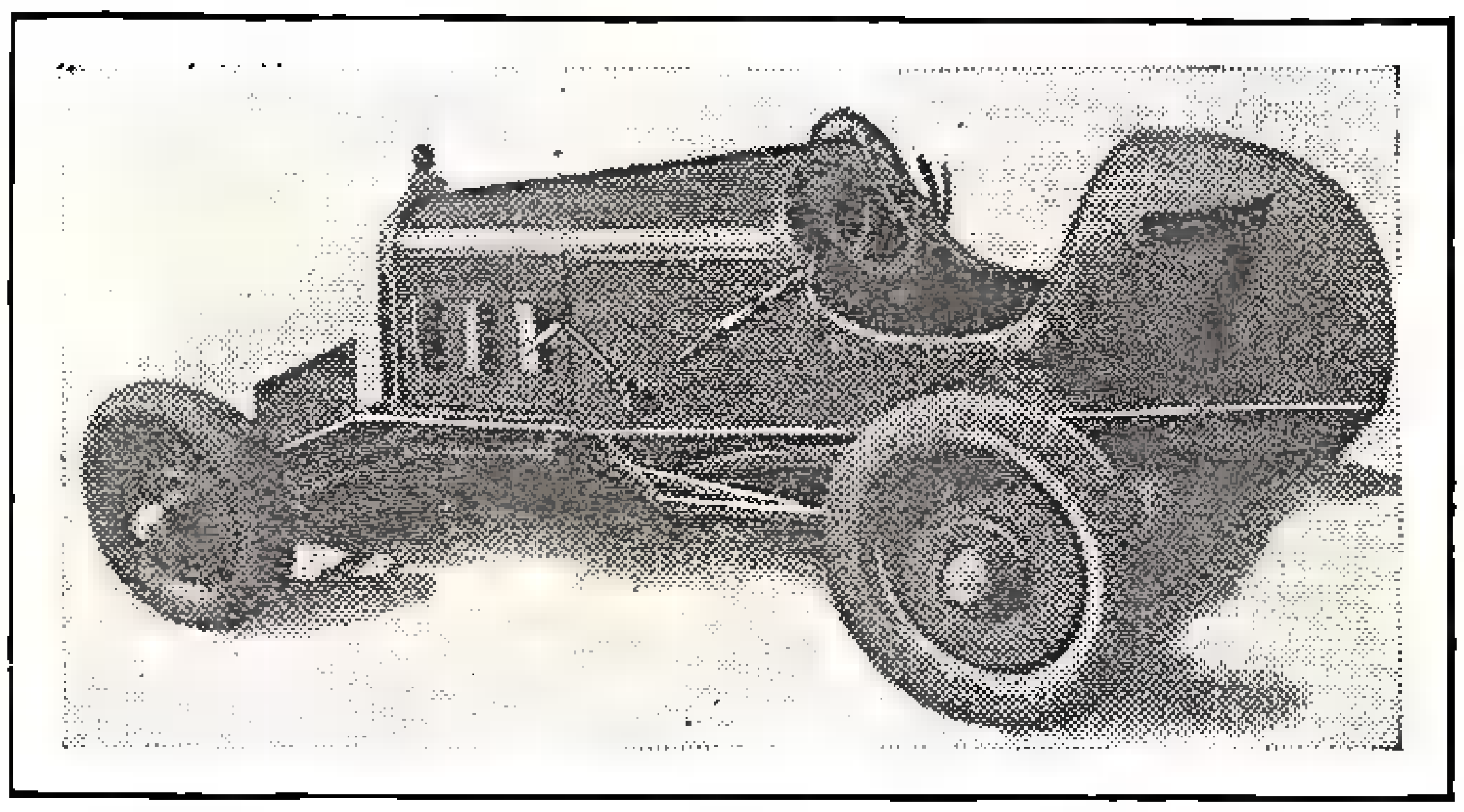
I am a reader of your very interesting Modern Mechanix. I saw the picture of Mr. Erickson's straddle bug. I am sending you an interesting photo of a hydro-glisseur that I helped to build in a French workshop for the British Government in 1918. It has a 190 H.P. V type Renault engine with two Zenith carburetors and five magnetos. Also a mechanical gasoline pump and two water pumps. It is equipped with an eleven six propeller and has a speed of ninety miles an hour at 1250 r.p.m.

To start from a position of rest, we had a crank and clutch that we pushed in with our foot; then we pulled the stick towards us, that put our ailerons up and our tail down. We accelerated to 1850 r.p.m. and that pulled us out of the water so that we rode on the steps of the floats which have three compartments made out of three-ply wood. The floats are suspended from a ball socket and the fuselage rides suspended on the three rubber suspenders which you see in the photo. We carried pilot and two passengers with a machine gun. You can see the gun scarf on the side of the passenger. The I. W. T. means Inland Water Transport.

This photo was taken in Mesopotamia, about six miles from Basra. I am standing on the plank which stretches across the floats. The one on the opposite side of the pier is a Count Lambert machine built on five floats, carries 10 passengers, is powered with a Samson 250 h.p. radial, 9 cylinders, 2 magnetos, and counter shaft with three chains. This machine would do 50 miles per hour. I have that photo too, but not a film. We were seven months building this machine at St. Raphael, Va., near Monte Carlo. Hope this is of some interest. Maybe you think I am nuts.

Yours respectfully,
Joseph Shaw,
British Royal Engineers.

* * *



R. W. Burgess, of Oakdale, Pennsylvania, made this nifty little car out of Henderson parts. Isn't she a honey?

Another small car addict is R. W. Burgess, whose address is directly given below so you may ask him about his buggy if you wish. I gave up

(Continued on page 18)

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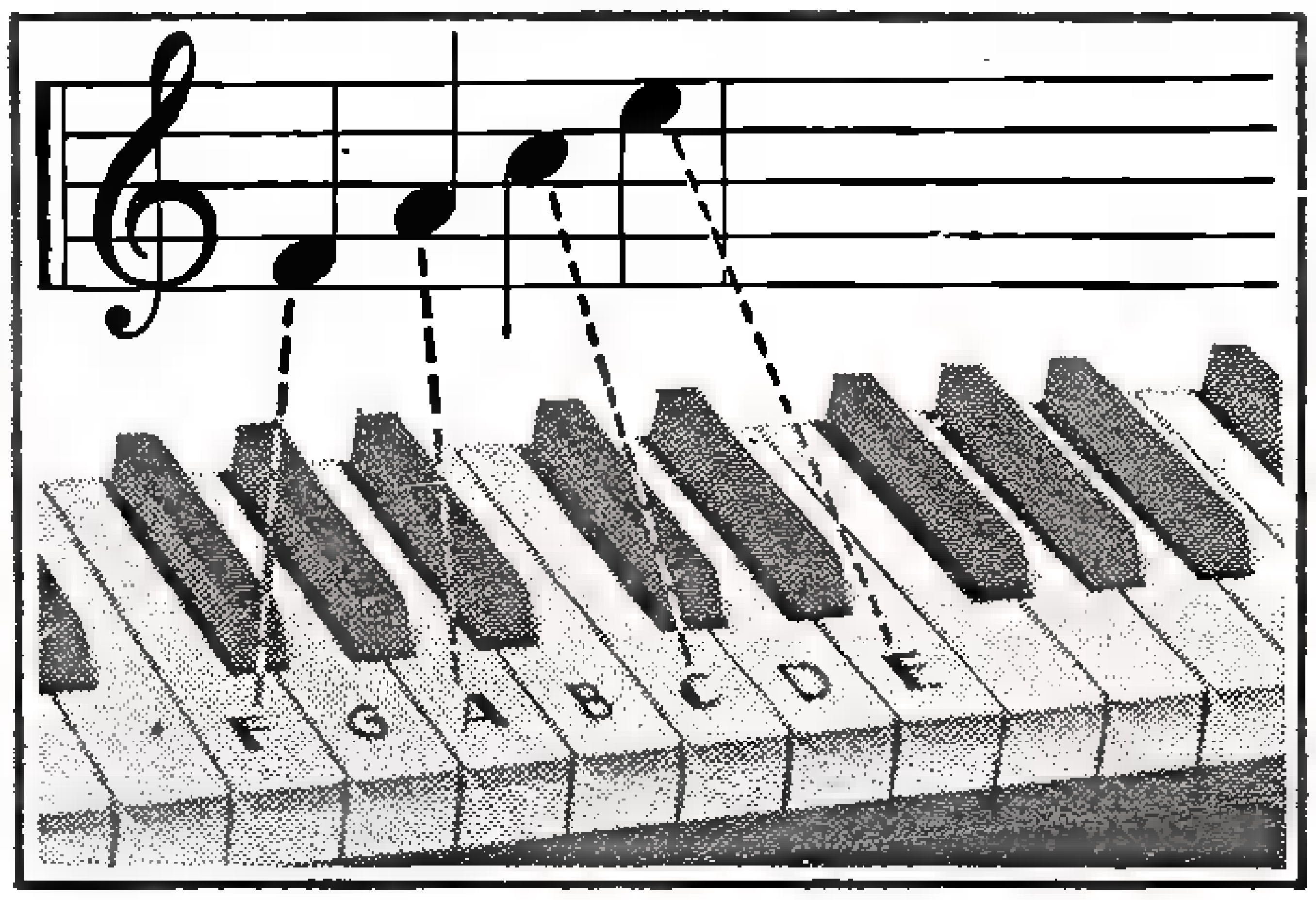

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City State

ANDY'S SHOP MAIL BOX

(Continued from page 16)

years ago trying to answer all the where is its and whose got its of these little cans.

Dear Sir:

Enclosed please find photos of Henderson powered midget I wrote you about some months ago. It is considerably different than those described in M. M. & I., and Mechanical Package Magazine. Wheels, for instance, cost $.95 each, not counting hubs which are Model T Ford. Tires, 20x4 S.S. airplane; tread 42-inch; wheelbase, 66-inch, mostly Model T parts. Cost me about $70.00 including wholesale cost of tires which was about $34.00.

If you are interested in any further details would be glad to supply any, in any form you desire, also can furnish working drawings of it.

Would be interested in ship model articles in your mag. Preferably working models using auto horn motors or clock work for power.

Very truly yours,
R. W. Burgess,
Box 104, R. D. No. 1
Oakdale, Pa.

* * *

A fellow after my own heart is Tom Connolly, way out up Oregon way. Read what he says, and note his last paragraph.

Shop Mail Box:

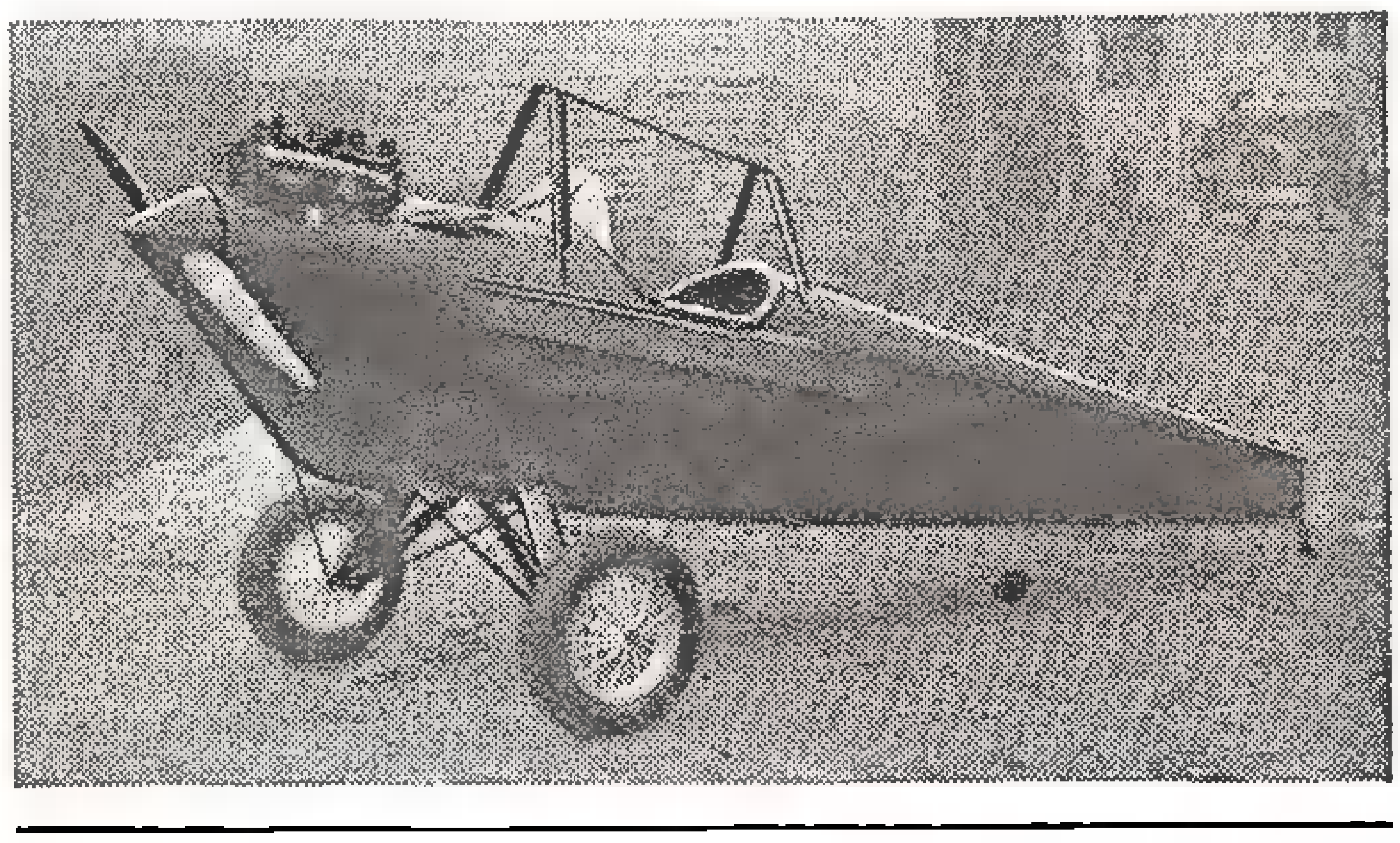
October issue contained two pictures of "Scram", 16-ft. inboard boat, with a statement that "plans would appear shortly."

I want to build this boat and I'm wondering if you have abandoned the idea of running these plans. If not, will you please tell me what issue they will be in, and also will a 1924 Star motor be a good power plant for it?

You should "bear down" harder on fellows who cannot make boat plans of their own, and then have not sense enough to follow "plans" worthy of publication.

Yours, etc.,
Thos. F. Connolly,
1505 N. E. 11th Ave.
Portland, Ore.

For your info, Tom, see this issue for the first part of Scram. She is going to be the most popular small boat plan ever run. Letters by the hundreds are pouring in here, and she'll prove to be the best bet you've built yet.



LeRoy Tyler, of Hobart, N. Y., built this sweet little Heath. Since the shot was taken he has winged and flown her. Some fun, we say.

(Continued on page 23)

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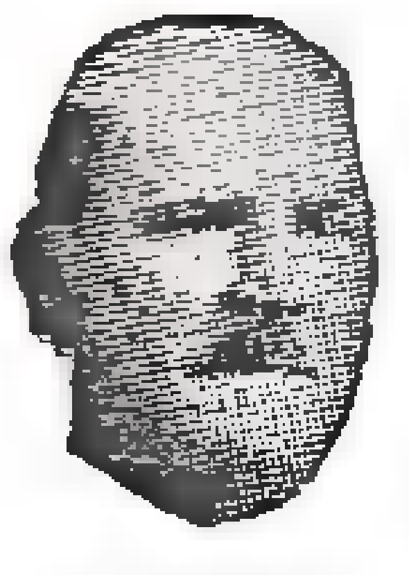

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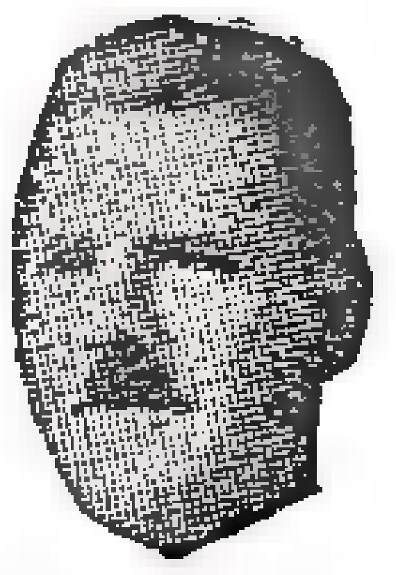

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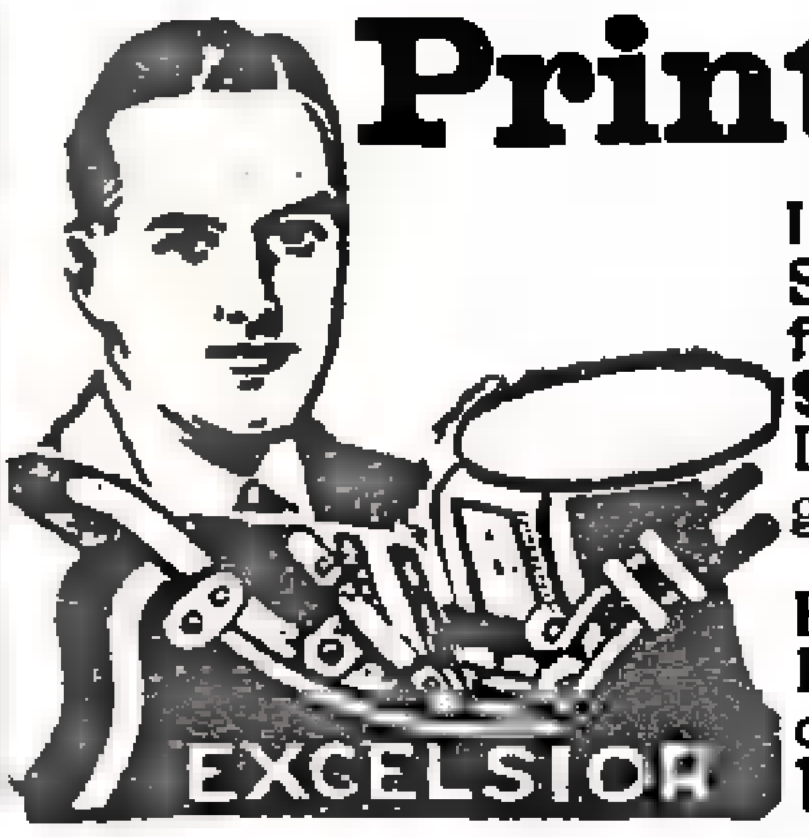

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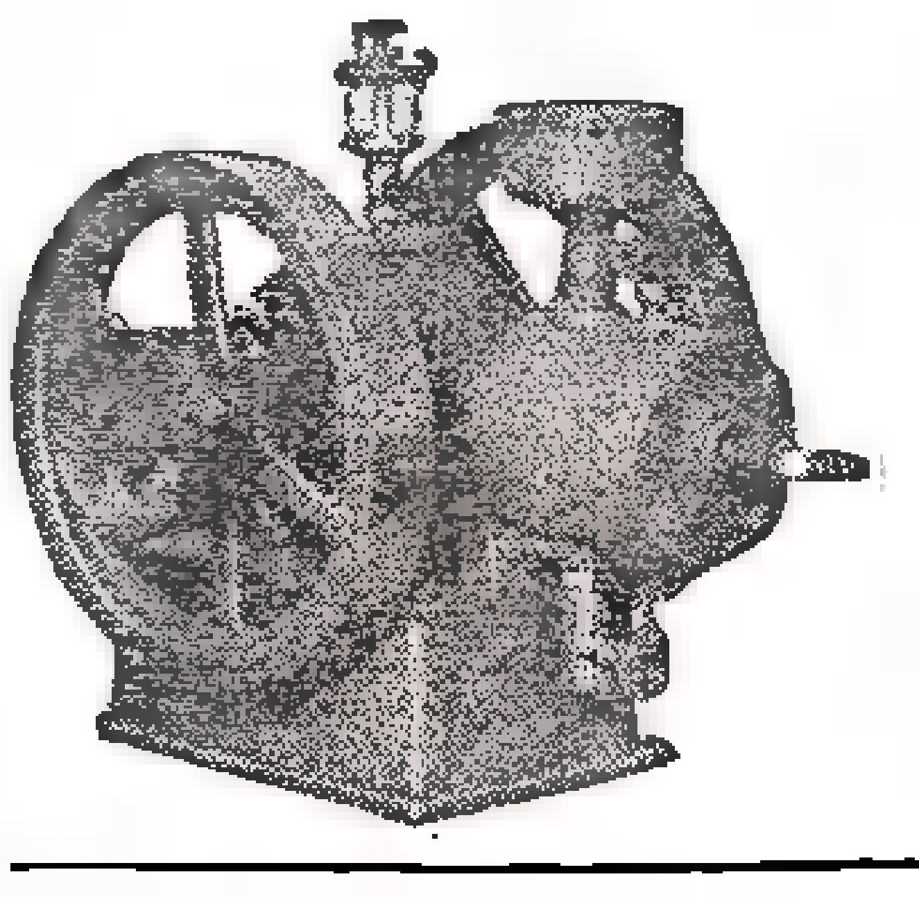

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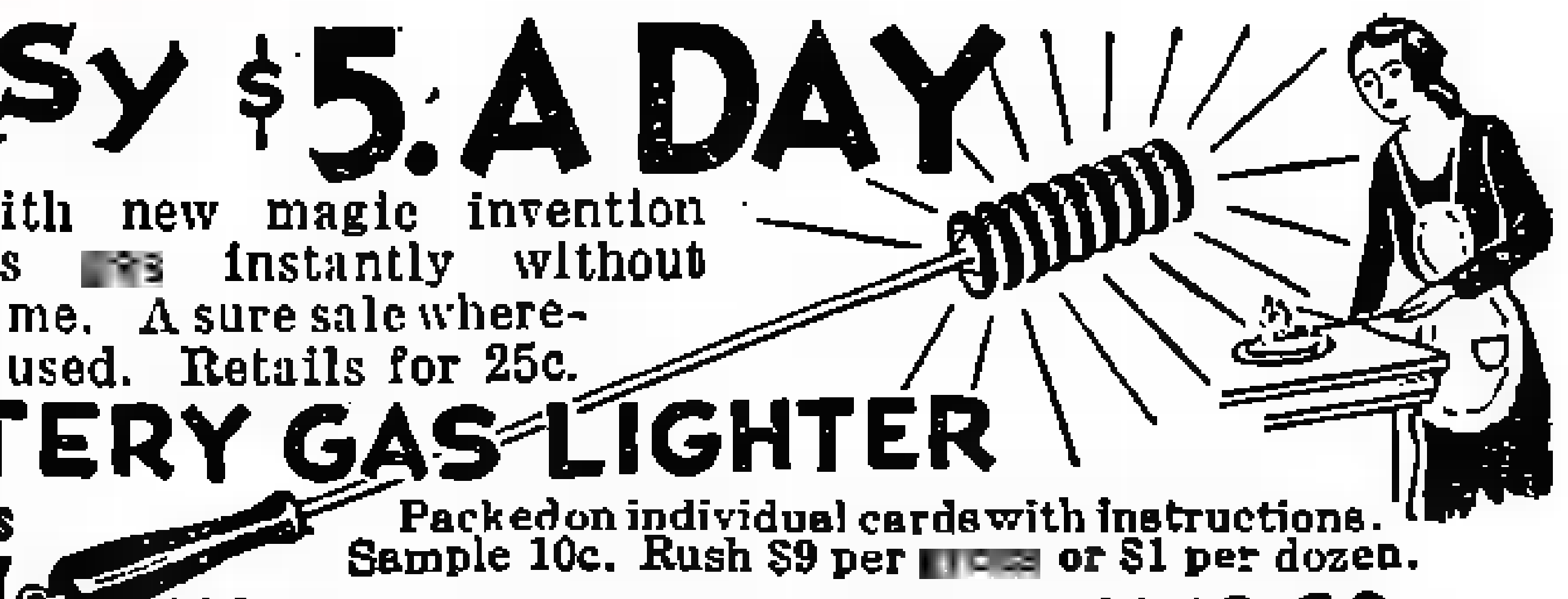

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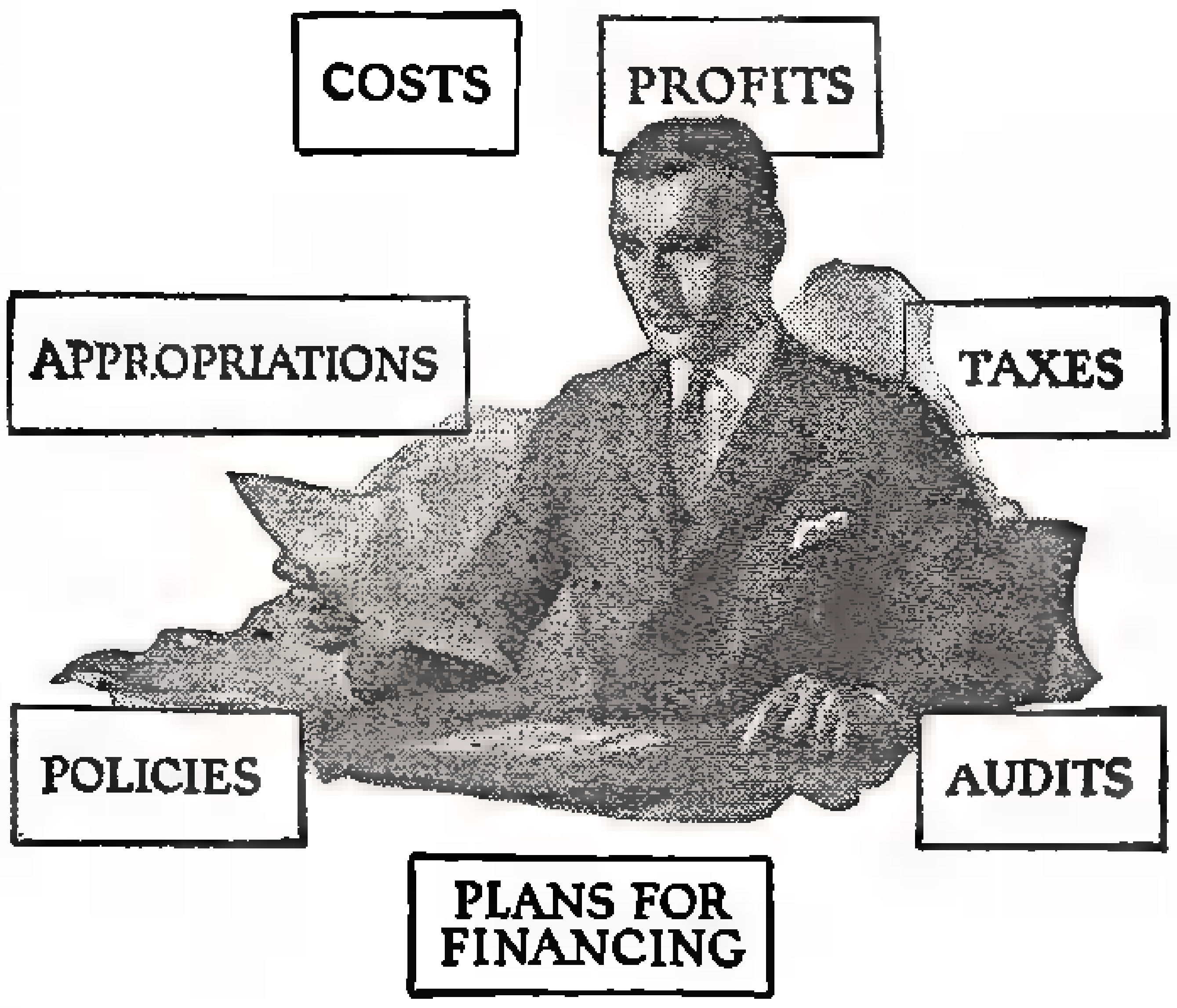

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SHORT wave construction kits, sets, supplies. Wholesale catalog 10c. Federal Radio, 4222 Clifford Road, Cincinnati, Ohio.

ROOTS AND HERBS

JUST OUT! World's greatest "Herb Almanac." Beautifully illustrated in natural colors. Contains over 500 old-fashioned herb medicine recipes and Indian secrets for home use. 10c (coin) postpaid. Worth dollars! Bontanics, 145 W. 112th St., Chicago.

SALESMEN WANTED

WANTED: Man in each county who will be satisfied with $25 to $35 a week earnings in the start doing service work and demonstrating new Automatic Fire Alarm in Schools, Homes, Hotels, Theatres, Public Buildings, etc. Write quick for county appointment. Fire-Cry Company, Dept. 616, Dayton, Ohio.

AMAZING new plan offers earnings up to $85 weekly. Life and disability protection at cost. Not insurance. Benefits up to $1,000. Membership and Registration only $6. You keep $5. Everybody, ages 1 to 80, prospect. American Aid, Dept. M-1, South Bend, Ind.

SHORT STORIES

SHORT Stories Revised. Typewritten. Marketed. Details Free. Hursh Service, Box K-1013, Harrisburg, Pa.

SONGS. POEMS. WRITERS

SONG writers wanted now. 50-50 plan. Indiana Song Bureau, Salem, Indiana.

SONGWRITERS

SONGWRITERS! Poems, melodies. Astounding proposition. **Hibbeler**, D195X, 2104 Keystone, Chicago.

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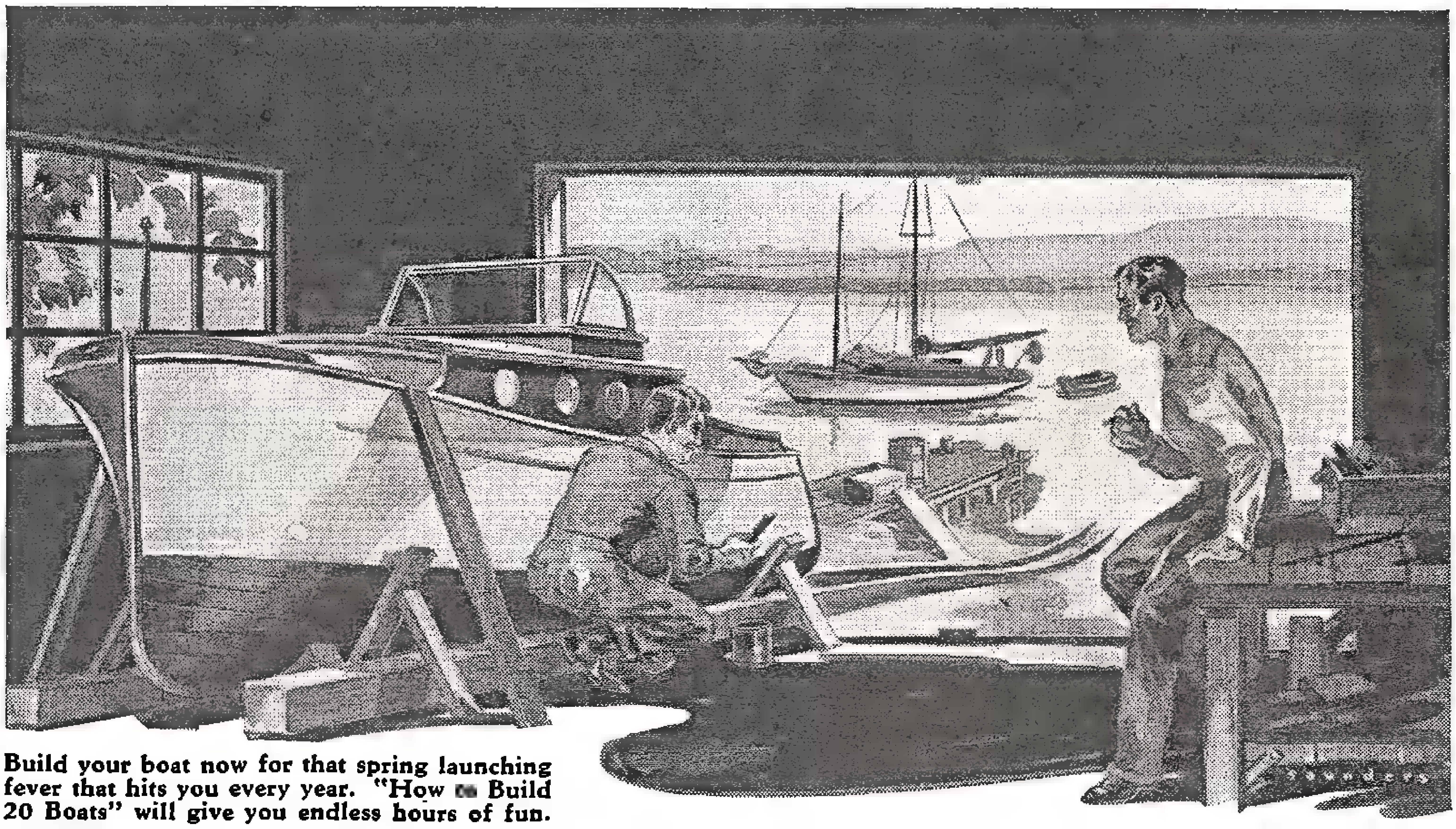
STAMPS! 100 diff. 2c; 500 diff. 35c; 1,000 diff. 90c. Tatham Stampco, D9, West Springfield, Massachusetts.

6 SCARCE triangles, Philatelic Magazine, 10c. Gardner, 5220 Cuthbert, Baltimore, Md.

VENTRILOQUISM

LEARN Ventriloquism by mail; small cost, 3c stamp brings particulars. Geo. W. Smith, 125 North Jefferson, Room S-558, Peoria, Ill.



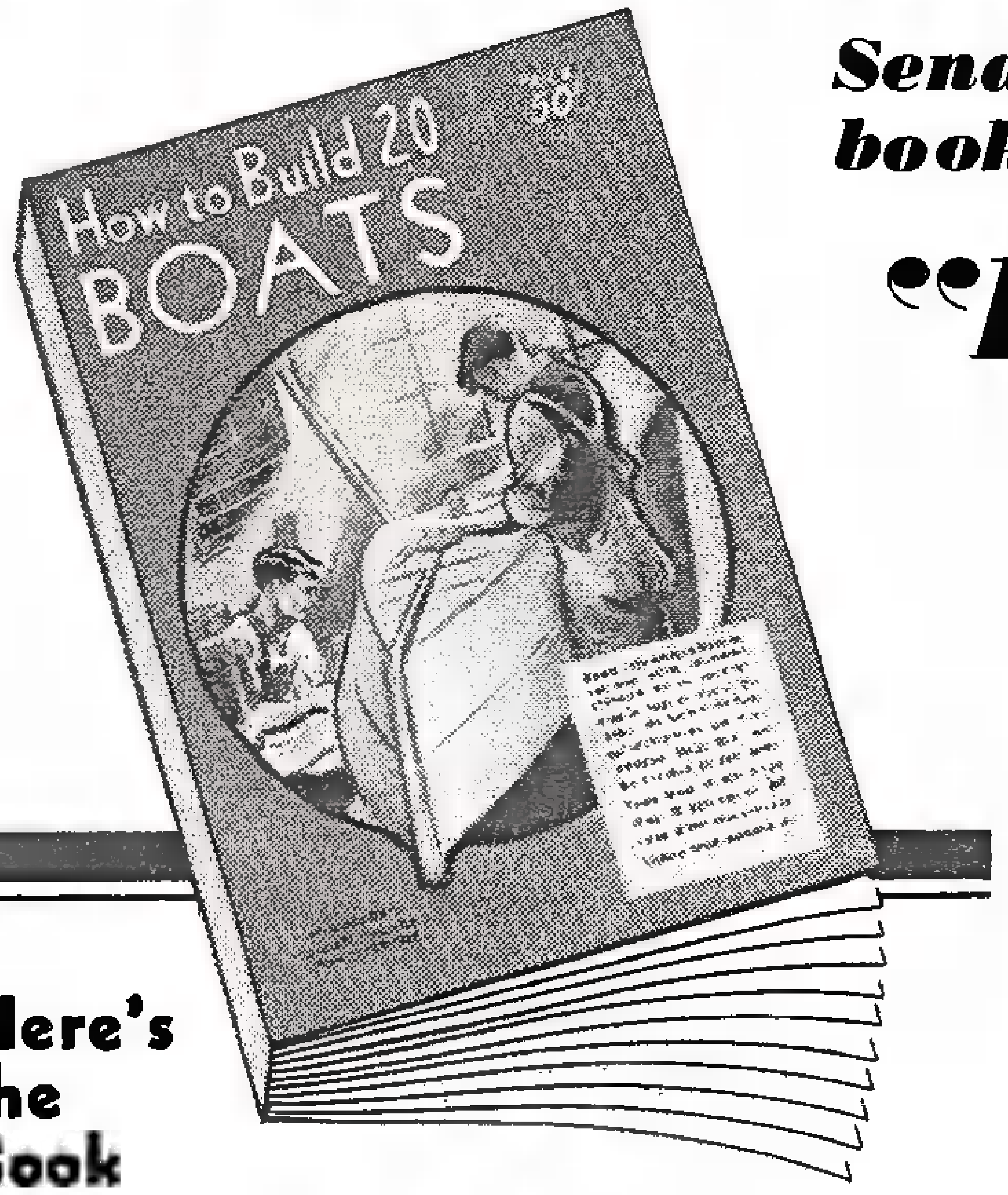
Build your boat now for that spring launching fever that hits you every year. "How to Build 20 Boats" will give you endless hours of fun.

Build Your Own Boat!

Send for this new 144 page book . . .

"How To Build 20 Boats"

JUST OUT!



Here's the Book for ALL BOAT BUGS! ...

For that fireside or springtime boat fever there is no richer treat than this collection of famous boat designs—some of them hitherto unpublished. All have been tested in actual use; there are no "duds". Get your copy of this eagerly sought file of designs, sharpen up that pencil, grip that hammer and satisfy that old urge to build your own boat.

PARTIAL LIST OF CONTENTS:
Plans for Gannet, Ford powered cruiser—Dorothy, 24-foot seagoing motorboat—Buddy, a Rabl tabloid cruiser—Mayfay, wonderful little raised deck cruiser—Wanderboat, a 16-foot outboarder—All Sorts, a 10-foot combination ice, sail and motorboat—Scram, sensational performing Ford A runabout—and thirteen other designs for all kinds of boats.

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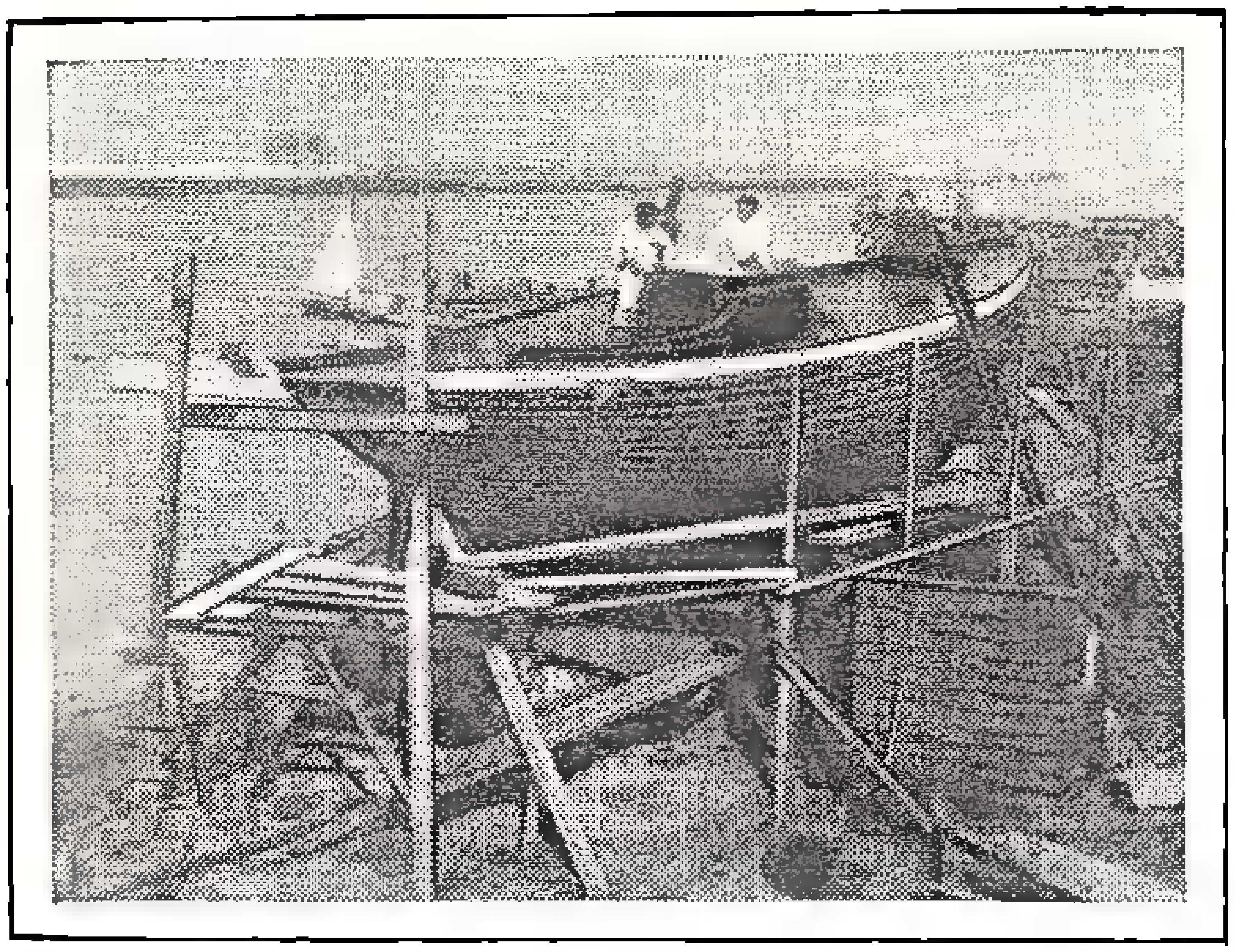
529 SOUTH 7TH STREET MINNEAPOLIS, MINNESOTA

ANDY'S SHOP MAIL BOX

(Continued from page 18)



Here is a shot an unknown fan sends in from California showing a 40-ft. cutter built by another reader for a round-the-world trip which is now in progress. What a life, mates!

Le Roy Tyler, in the Empire State, has some thing to say about a lightplane. Take me away, Roy:

Hobart, New York

Dear Editor:

Am enclosing some pictures of myself and Heath built complete from your plans and it flew and carried a 210-pound pilot by the name of Halsey F. Sheffield, 305 Godwin Ave., Ridgewood, N. J. It was a dandy job.

Note how cowling is put on.

Best wishes for 1933.

LeRoy Tyler.

* * *

A mercantile member of our gang, T. W. Ball, of Alanreed, Texas, has this interesting volley of comment to offer. I suggest you climb aboard and see what he has in this sanding machine. I bet it'll cure him of making offers, but for the meanwhile, Ball, ol' Boy, thanks for the script.

Alanreed, Texas.

Dear Andy:

I have been a reader of Modern Mechanix Magazine for several years—and have also noticed the articles written by you—good work old kid, keep the home fires burning.

My shop is a 30'x50' building, so you can imagine my floor space. I have most every thing for a complete shop—except a sanding machine. I bought several that were real good but the other day while out quail hunting, I happened to run across an old Delaval cream separator. I threw it in the car and brought her in for a general overhaul.

I welded an old turntable from a Victrola (about a 12" table) to the spindle—cutting off with a hack saw the arm which originally held the cream bowl above. I took the crank off and the shaft which is connected to a large sprocket and discarded it. The machine originally turned 3600 rev's—this lowered the rev's to about 600. I put a 6" pulley on the shaft that runs the spiral spindle, also welded a

(Continued on page 28)

"What would I do if I lost my job?"

SUPPOSE your employer notified you tomorrow that he didn't need you any longer? Have you any idea where you could get another position?

Don't have this spectre of unemployment hanging over your head forever. Train yourself to do some one thing so well that your services will be in demand. Employers don't discharge such men. They *promote* them!

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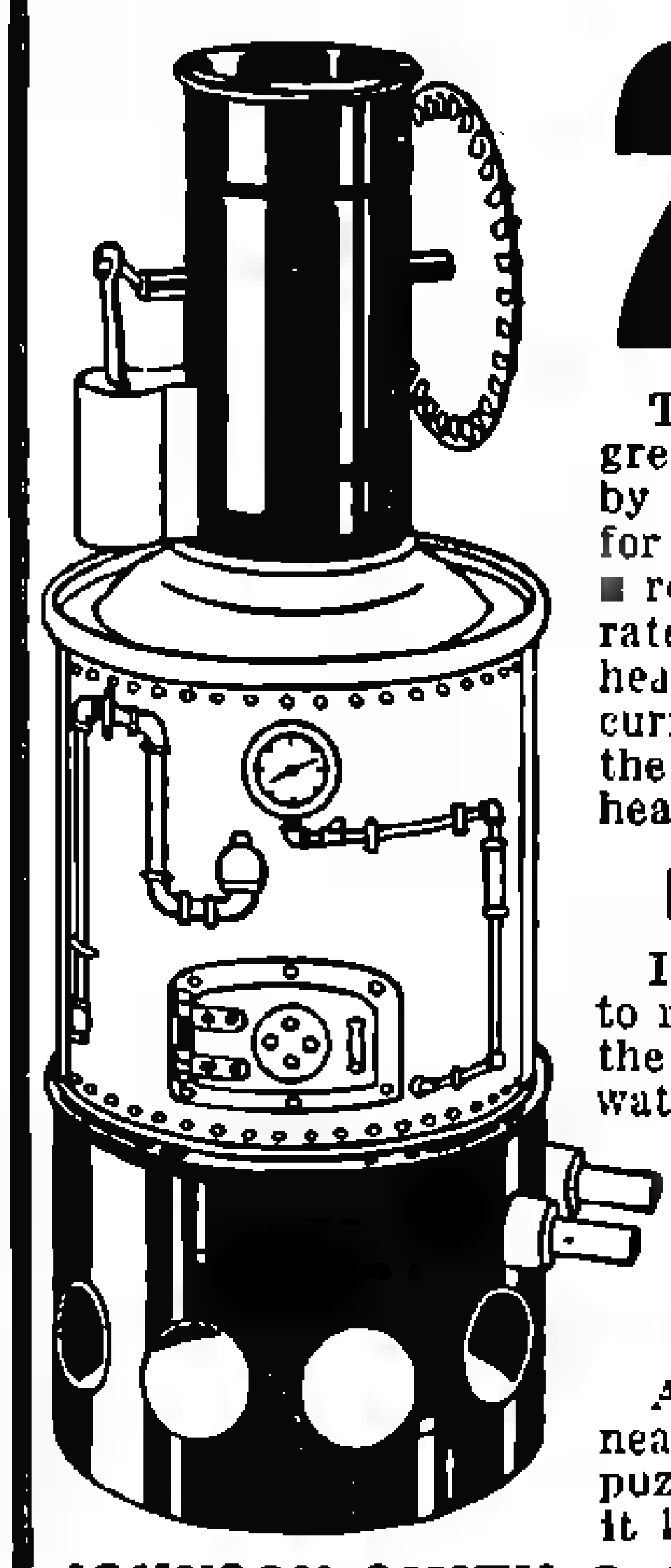
THIS GREAT BIG STEAM ENGINE



25c

Electric Model
Add 10c for postage and packing

The world's biggest value in mechanical toys. A great big steam engine, measuring 7 inches in height by 2½ inches in diameter (7½ inches in circumference) for **ONLY** 25 cents. You should see it run, too. It's a revelation to see the fly wheel spin around at a great rate as soon as you "get steam up". The boiler is heated by electricity. Just hook up with your house current, fill the boiler with water, and in a few minutes the engine is running at top speed. No mussy canned heat or alcohol to bother with.

FULLY TESTED—GUARANTEED TO RUN

It is foolproof, harmless, fully tested and guaranteed to run. A scientific toy that illustrates the principle of the steam turbine. Runs for hours on one filling of water. Every boy should have one. Wonderfully well made—splendid value for the money. Easily worth a dollar, yet sells for **ONLY 25c**, with 10c extra for postage and packing.

MAMMOTH NOVELTY CATALOG 10c

Add 10c more if you want our gigantic catalog, nearly 800 pages of electric and other novelties, puzzles, tricks, jokes, etc. You never saw a book like it before.

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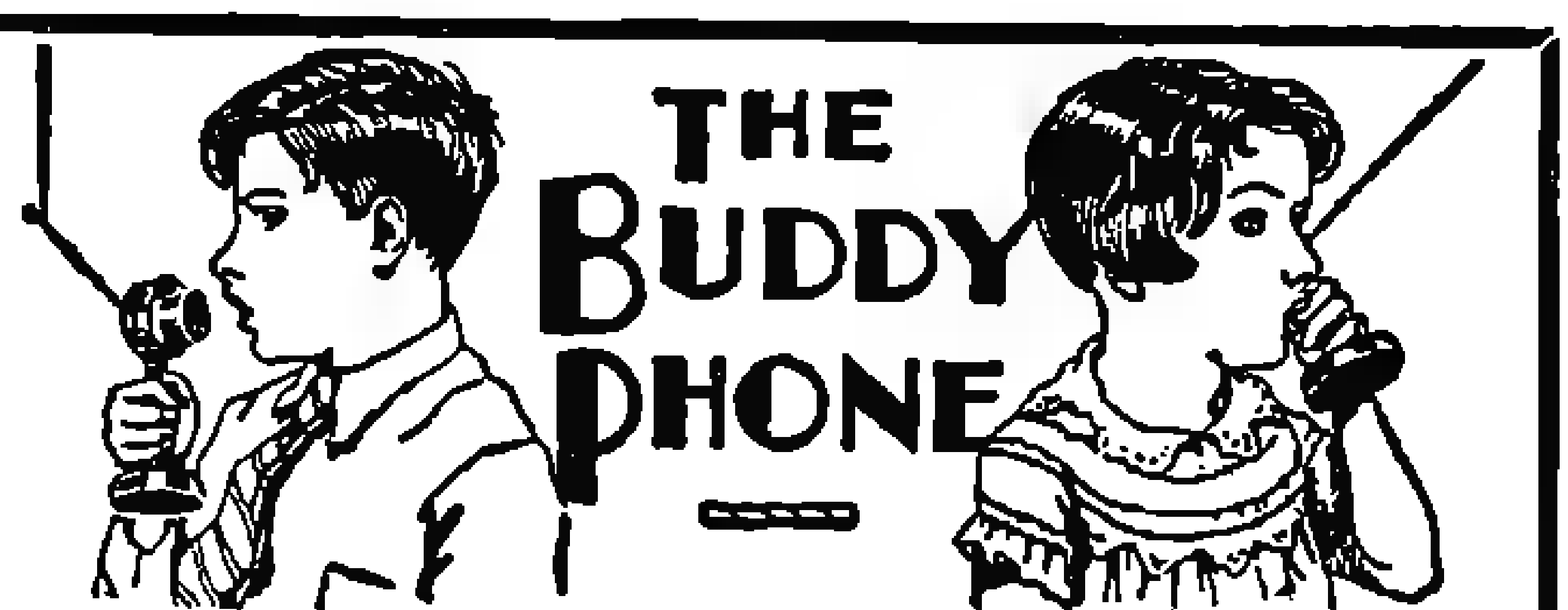
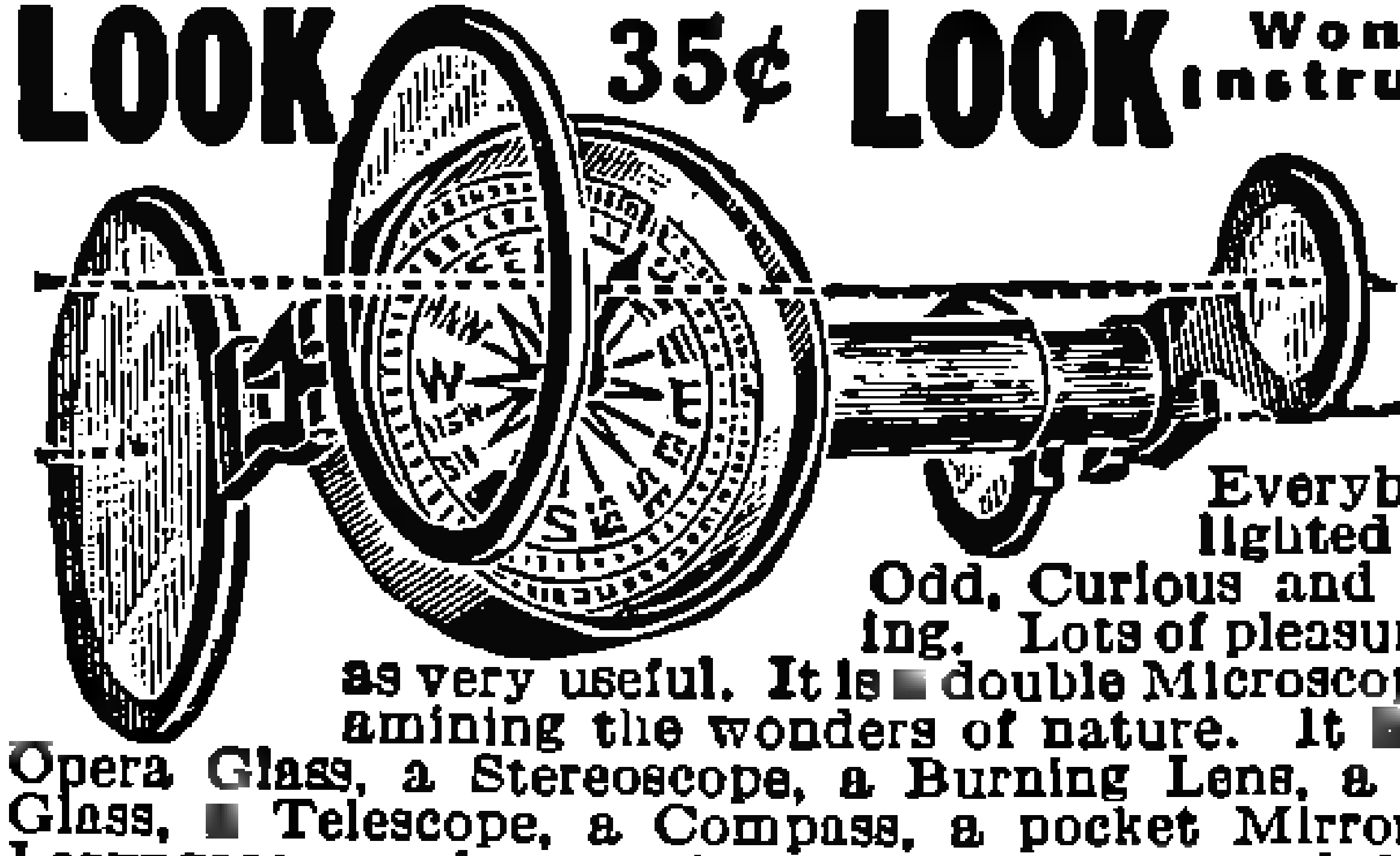


A Real Telephone. Works Indoors or Outdoors. 100 ft. or 1000 ft.

Though this is merely a very clever toy, it is quite as serviceable for short distances as the most elaborate apparatus made and it is much less liable to get out of order or to need adjustment; in fact it cannot be rendered inefficient unless roughly handled. No troublesome battery, no intricate "hook-up." Can be put to practical use from one room to another, up and down stairs, around corners, etc. The patented sounding discs transmit and receive the voice perfectly, making it a really practical talking telephone. Set consists of two phones, transmission cord and full instructions. **PRICE ONLY 65c per set postpaid. JOHNSON SMITH & CO.**

LOOK 35¢ LOOK

Wonderful instrument.



Greatest thing yet. Nine separate articles in one. Everybody delighted with it. Odd, Curious and Interesting. Lots of pleasure as well as very useful. It is a double Microscope for examining the wonders of nature. It is also an Opera Glass, a Stereoscope, a Burning Lens, a Reading Glass, a Telescope, a Compass, a pocket Mirror, and a Laryngoscope—for examining eye, ear, nose and throat. It is worth all the cost to locate even one painful cinder in the eye. Folds flat and fits the pocket. Something great—you need one. **Don't miss it. Sent by mail. Only 35c or 3 for $1.00.**

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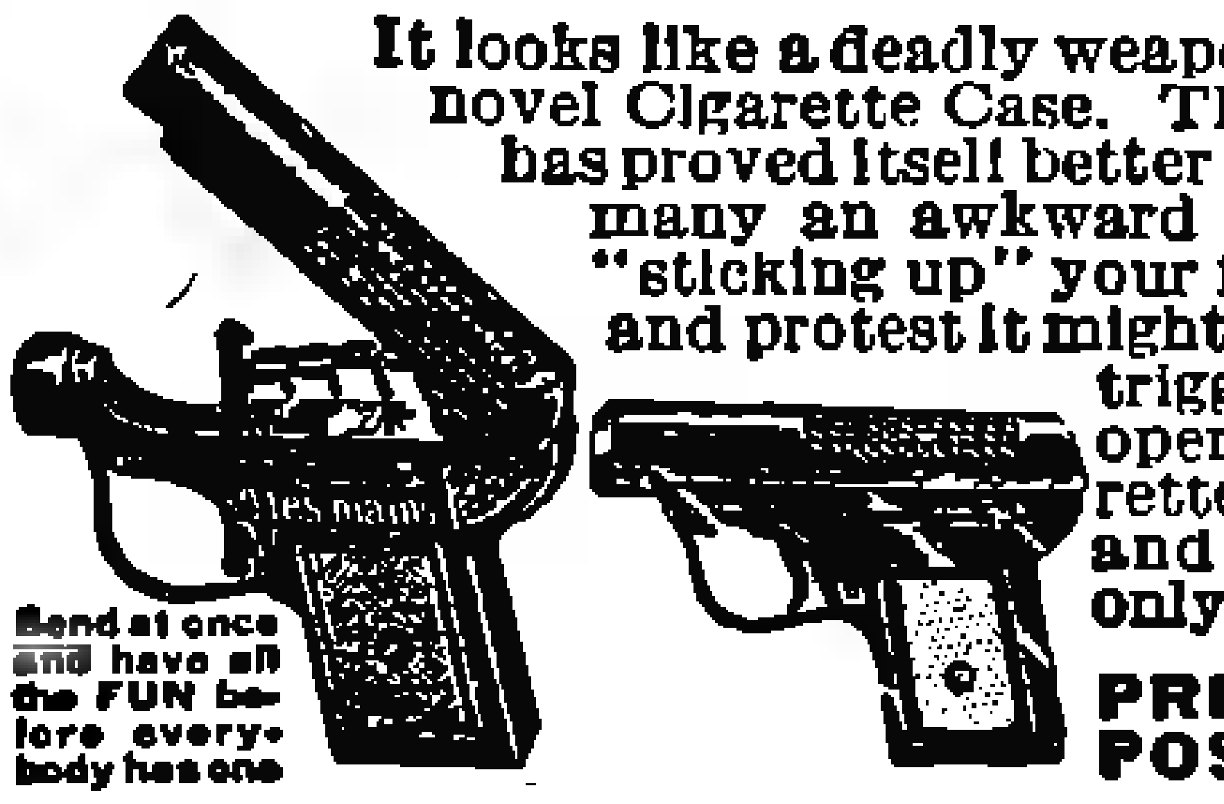
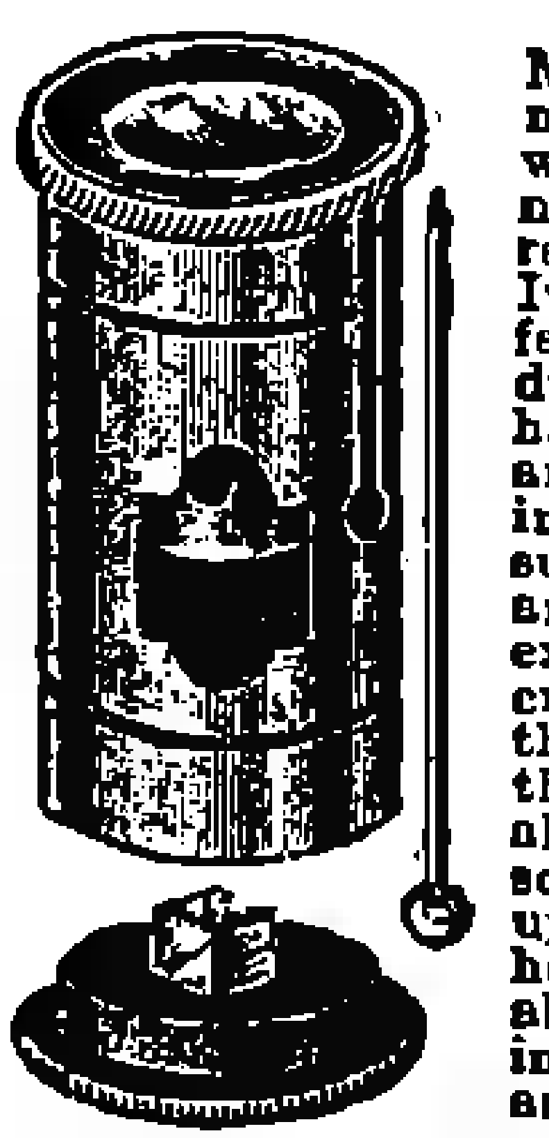

Send at once and have all the FUN before everybody has one

It looks like a deadly weapon, but it is merely a novel Cigarette Case. This clever contrivance has proved itself better than the real thing in many an awkward encounter. Great fun "sticking up" your friends. They squirm and protest it might be loaded. Pull the trigger and the slide [illegible] open disclosing the cigarettes. Well made, light and compact. Weight only 2 ounces.

PRICE POSTPAID 35c

MICROSCOPE and FLOROSCOPE

COMBINES ALL THE POWER AND DEFINITION OF THE MORE EXPENSIVE MICROSCOPE
SURPRISINGLY GREAT MAGNIFYING POWER
EXAMINE GERMS IN WATER, CHEESE, SUGAR, ETC.



There are few things so interesting and valuable as a Microscope. It enables you to minutely examine mineral animal and vegetable specimens, to test cotton, wool, silk, seeds, water, flour, cheese, milk, and in fact nearly all articles of food. Unwholesome meat can be readily detected and ferments can be closely watched. It is exceedingly interesting to examine the spores of ferns, soda, sugar, salt, alum and other crystals, the dust (scales) from moth and butterfly wings, human hairs, [illegible] and insects, while the animalculae in water are a never-failing source of wonder. Most interesting experiments can be performed with an instrument such as this. Place a small piece of cheese in a box and allow insects to feed on it for a day or two. Then examine a tiny portion of the cheese under the Microscope and you will see little animals, magnified to the size of large beetles; you can count their legs and the joints in them, the talons or claws upon each foot, also the hair or bristles upon their bodies. Or, obtain some stagnant water; deposit a small portion of scum upon the object glass of the Microscope with a pin's head, and you will see beautiful animalculae swimming about with as much freedom as though they were fish in the boundless ocean. It is a truly wonderful sight and an endless source of interest and enjoyment for everybody. The Microscope is made of brass and is capable of magnifying 150 areas and although small and compact, it will cover a very wide range of microscopic research. **Price only 50c Postpaid. JOHNSON SMITH & CO. Dept. 919 RACINE, WIS.**

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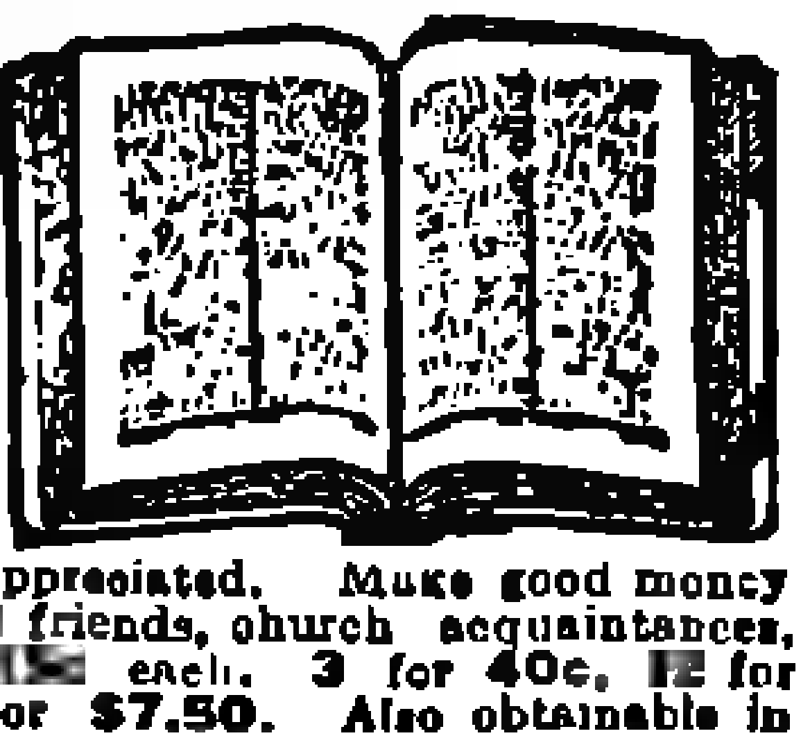
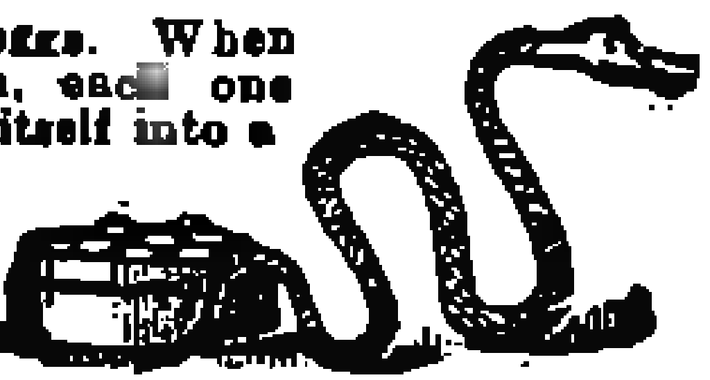


GREAT CURIOSITY Smallest Bible in the World. Size of a postage stamp. 200 Pages. Said to bring good luck to the owner. A genuine work of art. Must be seen to be appreciated. Make good money selling them to friends, church acquaintances, etc. PRICE 15c each. 3 for 40c, 12 for $1.35, 100 for $7.50. Also obtainable in Leather Binding, with gold edges. Price 50c each, 3 for $1.25, [illegible] per doz. Magnifying Glass for use with Midget Bible 15c

SERPENT'S EGGS



Box contains 12 eggs. When lit with a match, each one gradually hatches itself into a snake several feet long, which curls and twists about in a most life-like manner. **Price per box. 10c postpaid. 3 for 25c**

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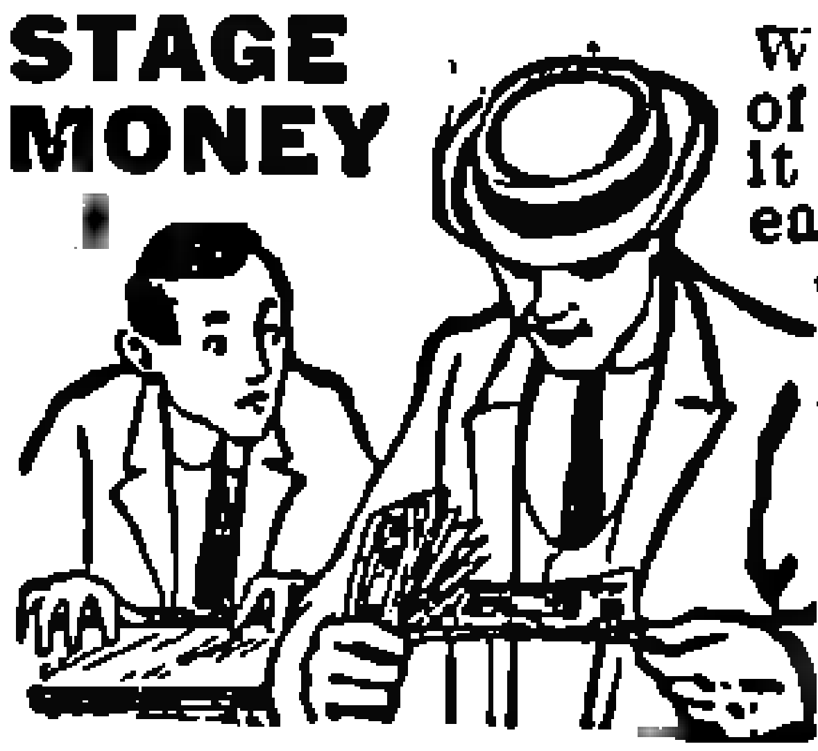

With a bunch of these bills, it is easy for each person of limited means to appear prosperous by flashing a roll of these bills at the proper time and peeling off a genuine bill or two from the outside of the roll, the effect created will be found to be all that [illegible] be desired. **Prices, postpaid: [illegible] Bills 20c, [illegible] for 50c, or $3.50 thousand postpaid.**

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The Magic Nose Flute, or Humanatone, is a [illegible] novel musical instrument that is played with nose and mouth combined. There is just a little knack in playing it which, when once acquired after a little practice, will enable you to produce very sweet music that somewhat resembles a flute. There is no fingering, and once you have mastered it you can play all kinds of music with facility and ease.

JOHNSON SMITH & CO.

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More fun than fighting with your wife. Look just like ordinary matches. As the victim tries to light them he gets quite a surprise.

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Greatest boys' book written. Tells how to make a Pinhole Camera, a Canoe model Railroad, a Telephone, Boomerang, Telegraph Instrument, Box Kite. Talking Machine. Microscope. Electric Motor. Electric Door Bell. Water Wheel. Paddle Raft, a pair of Skis, a Dog Sled, Bird House, Rabbit Yard, etc. 64 pages. 150 illustrations. **PRICE 10c.**

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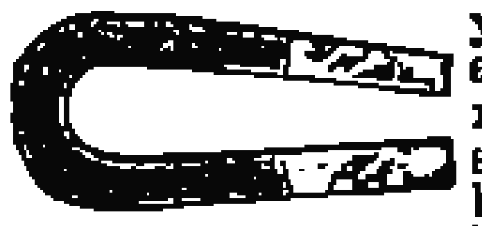
FUN WITH MAGNETISM. 50 novel and unique experiments in **MAGNETISM** that you can perform with the aid of an ordinary magnet: magnetic chain, fleeing and spinning needle, nail and ball cluster, magnetic fish, top, motor, magnetic billiard balls, many other stunts. Also interesting information about lodestone, magnetism, electricity, etc. **PRICE 10c p.pd.**



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MONEY MAKING SECRETS. Golden opportunities for everyone. 64 page copyrighted book chock full of money-making ideas, recipes, formulas, wrinkles, trade secrets, etc. Businesses that can be started with little or no capital at home in spare time. **10c postpaid.**

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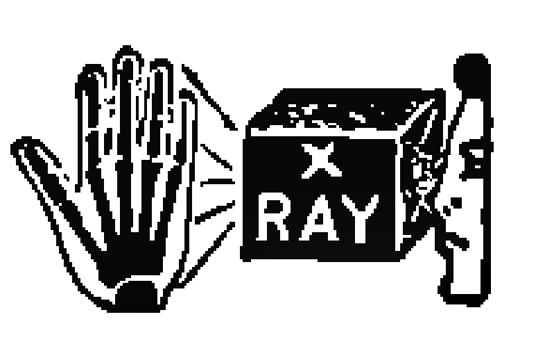
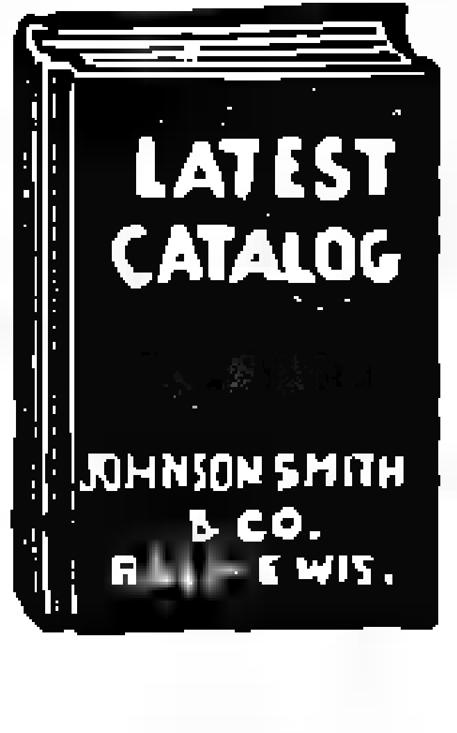


A wonderful little instrument producing optical illusions both surprising and startling. With it **you can see what is apparently the bones of your fingers, the lead in a lead pencil, the interior opening in a pipe stem, and many other similar illusions. Price 10c, 3 for 25c.**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Dept. 919 **RACINE, WIS.**

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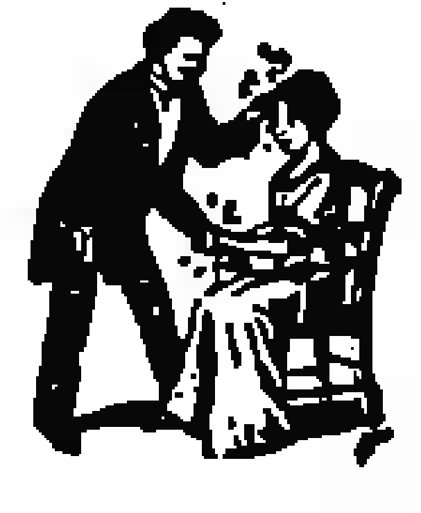
With the aid of this dream book and fortune-teller. The key to your future. Will you be lucky in love? Successful in business? Will you be wealthy? Complete with dictionary of dreams with descriptions and correct interpretations, with lucky numbers, fortunate days, oracles, divination, palmistry, etc. Also tells how to tell fortunes by various methods, by grounds of coffee or tea, by dominoes, by marks, scars or moles, miscellaneous games with cards, lucky days, weeks, months, years; how to receive oracles by dreams, finger nail observations, etc. **PRICE 10c**

LEARN TO HYPNOTIZE



This 64-page book tells how. Explains all about Hypnotism, how to hypnotize, how to produce sleep, how to awaken a subject, how to hypnotize animals, hypnotism in diseases, hypnotism for scientific practice, illusions and halucinations, personal magnetism, thought transference, etc. Written in plain, everyday language that anybody can understand. **PRICE 10c postpaid.**

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64-page book tells how. Gives the meaning of each and every card, how to deal and lay them out. Everything explained in simple language. **PRICE 10c postpaid.**

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A PRIVATE TELEGRAPH SET of YOUR OWN

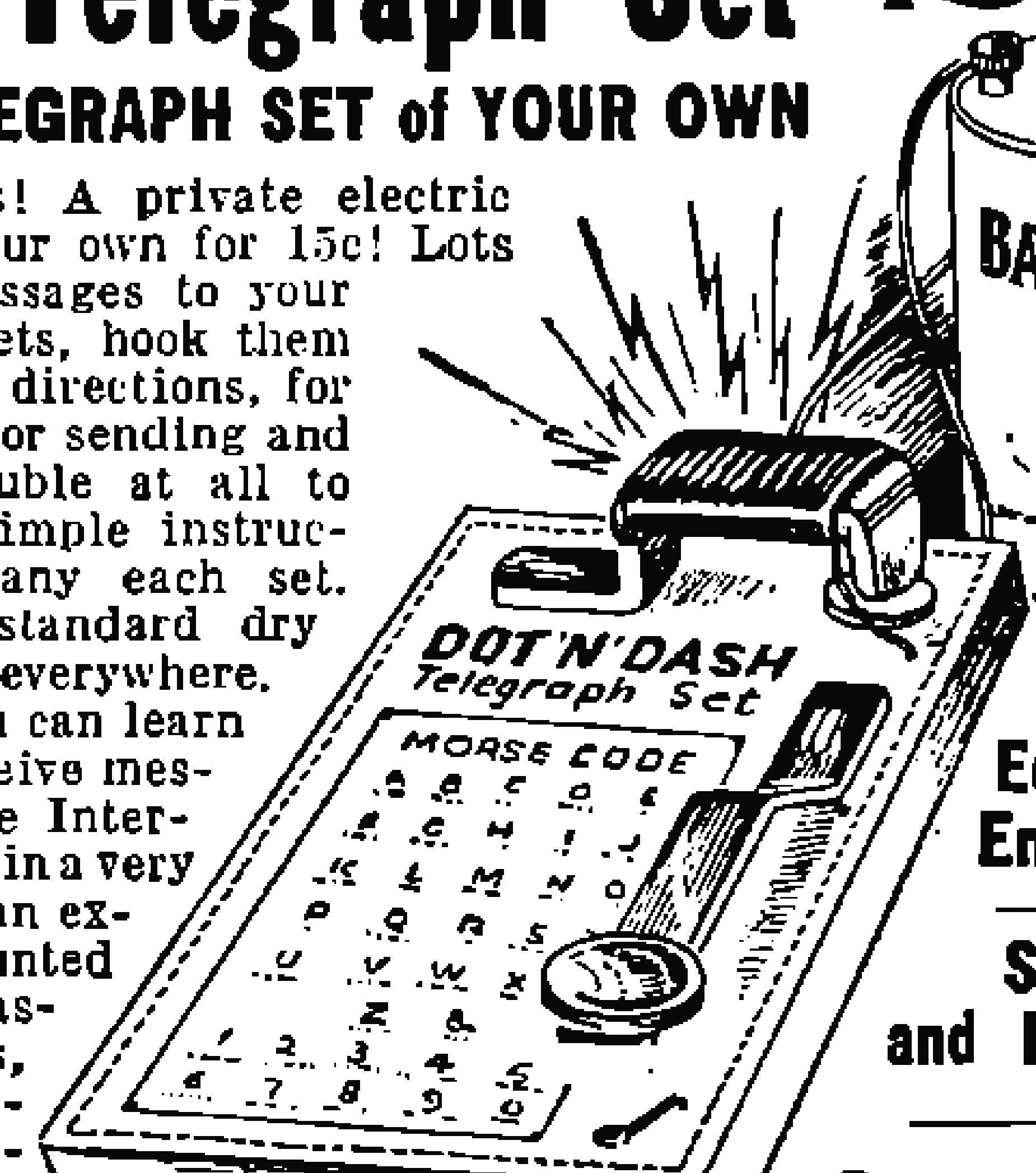
Here you are boys! A private electric telegraph set of your own for 15c! Lots of fun sending messages to your friends. Get two sets, hook them up as shown in the directions, for two-way messages for sending and receiving. No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages by the Morse International Code, and in a very short time become an expert operator. Mounted on wooden base measuring 4 x 3 inches, first class construction throughout, complete with key, sounder, magnet, miniature Western Union blanks, packed in a neat box with full illustrated instructions—ALL FOR 15c (without battery) postpaid. Canada [illegible] Foreign 20c.

JOHNSON SMITH [illegible] CO. Dept. [illegible] **RACINE, WIS.**

Novel Educational Entertaining

Sending and Receiving

Become an expert Telegraph Operator in a very short time


BATTERY
DOT 'N' DASH Telegraph Set
MORSE CODE

BLANK CARTRIDGE PISTOL

PRICES 50c $1.00

This well made and effective Pistol is modeled on the pattern of the latest type of Revolver, the appearance of which alone is enough to scare [illegible] burglar, whilst, when loaded, it will probably prove just as effective as [illegible] revolver with real bullets, without the danger to life. It takes the standard .22 Calibre Blank Cartridges, that are obtainable most everywhere. Even the most timid woman can use it with perfect safety and frighten a thief without risk to herself or anyone else. **A Great Protection Against Burglars, Tramps and Dogs.** You can have it lying about without the danger attached to other revolvers. **PRICE ONLY 50 CENTS. Better make and superior quality for $1.00. Blank Cartridges .22 cal., 50c per 100. Cowboy type Holster 50c.** Not prepaid. Shipped Express only.

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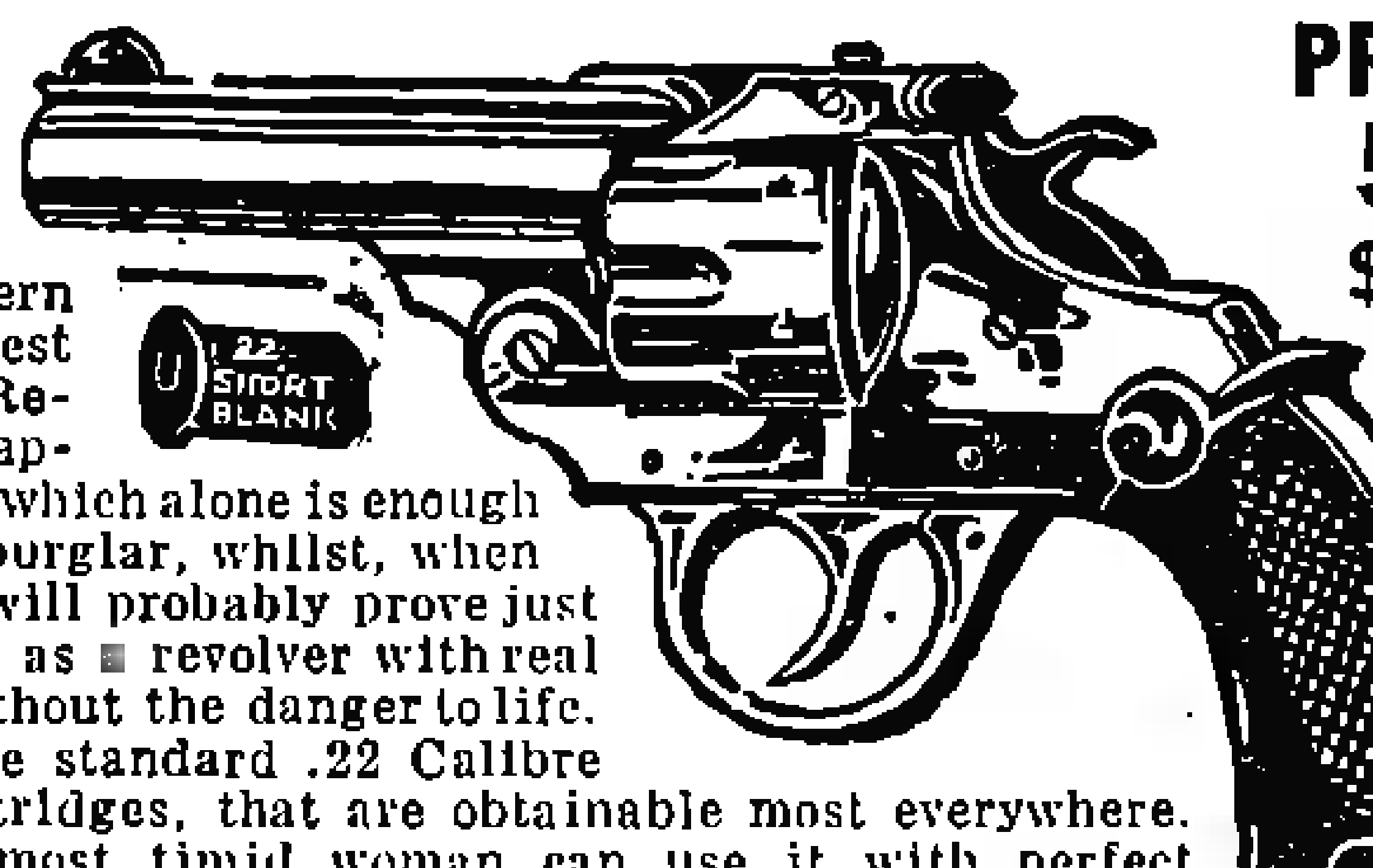

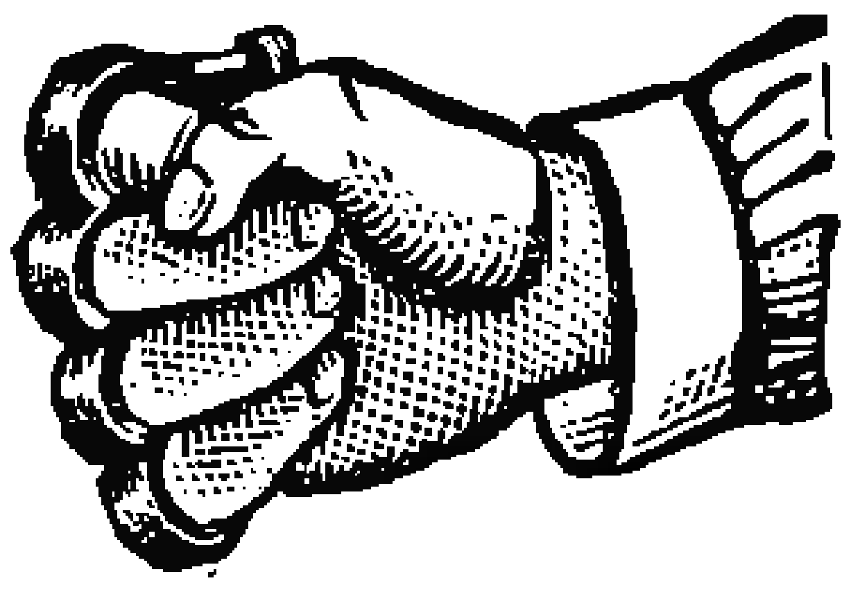

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Used by police officers, detectives, sheriffs, night watchmen and others as [illegible] means of self-protection. Very effective. Easily fits the hand, the fingers being grasped in the four holes. Very useful in an emergency. Made of aluminum they are very light, weighing less than two ounces. Handy pocket size always ready for instant use. **Price 25c each, 2 for 45c postpaid.**

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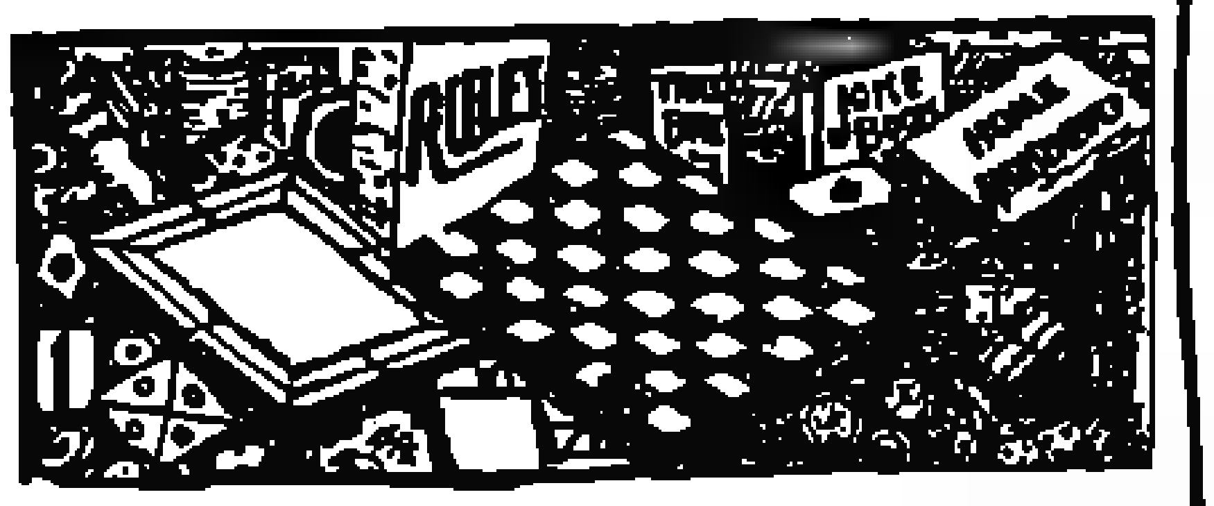

180 Jokes and Riddles, 21 Puzzles and Problems, Gypsy Fortune Teller, 50 Money Making Secrets, [illegible] Experiments in Magic, 58 Verses in Comic Poetry, 7 Parlor Games, 15 Card Tricks, 10 Funny Readings, 71 Toasts, Cut-outs for Checkers and Chess, Dominoes, Fox and Geese, 9 Men Morris, Anagrams, etc. All for 15c. Postpaid.

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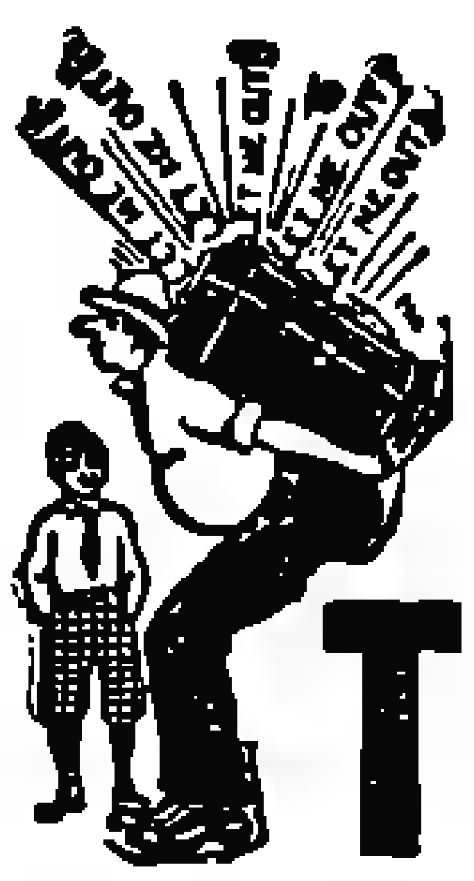
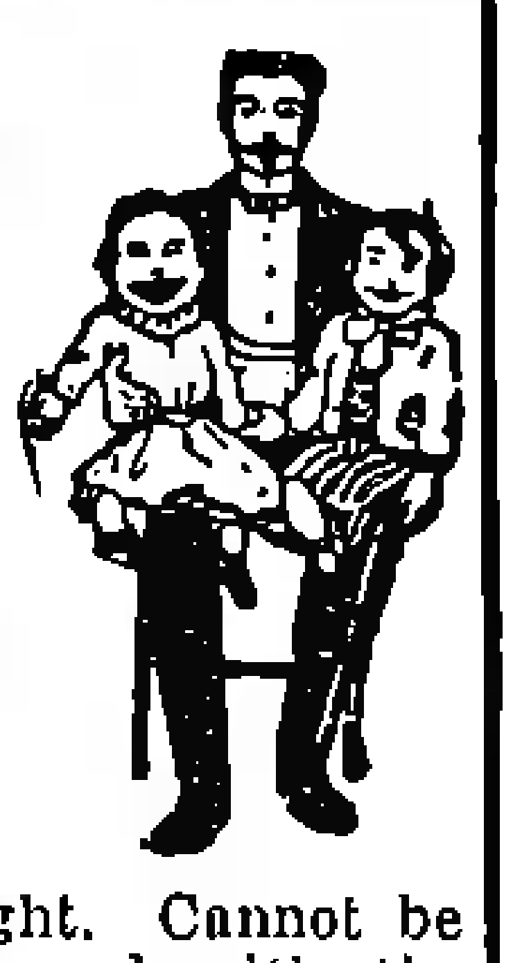
Enjoy the concerts, baseball games, market reports, latest news, etc. This copyrighted book "EFFICIENT RADIO SETS" shows how to make and operate inexpensive Radio Sets, the materials for which can be purchased for [illegible] mere trifle. Also tells how to build a short-wave Receiver for bringing in foreign stations, police calls, ships at sea, etc. **ONLY 15c, postpaid.** *770 page catalog 10c.*

BOYS! BOYS! BOYS!

THROW YOUR VOICE





Into a trunk, under the bed, under a table, back of the door, into a desk at school, or anywhere. You get lots of fun fooling the teacher, policemen, peddlers, and surprise and fool all your friends besides.

The Ventrilo

is a little instrument that fits in the mouth out of sight. Cannot be detected. It is used in connection with the above, and with the aid of this wonderful DOUBLE THROAT, OR VENTRILO, you can imitate many kinds of birds, animals etc. Remember you get everything for ONLY TEN CENTS—a booklet giving you full instructions how to become [illegible] ventriloquist and throw your voice, also the Double Throat, or Ventrilo, the Original Bird Call and Prairie Whistle for giving imitations of birds and beasts, etc.

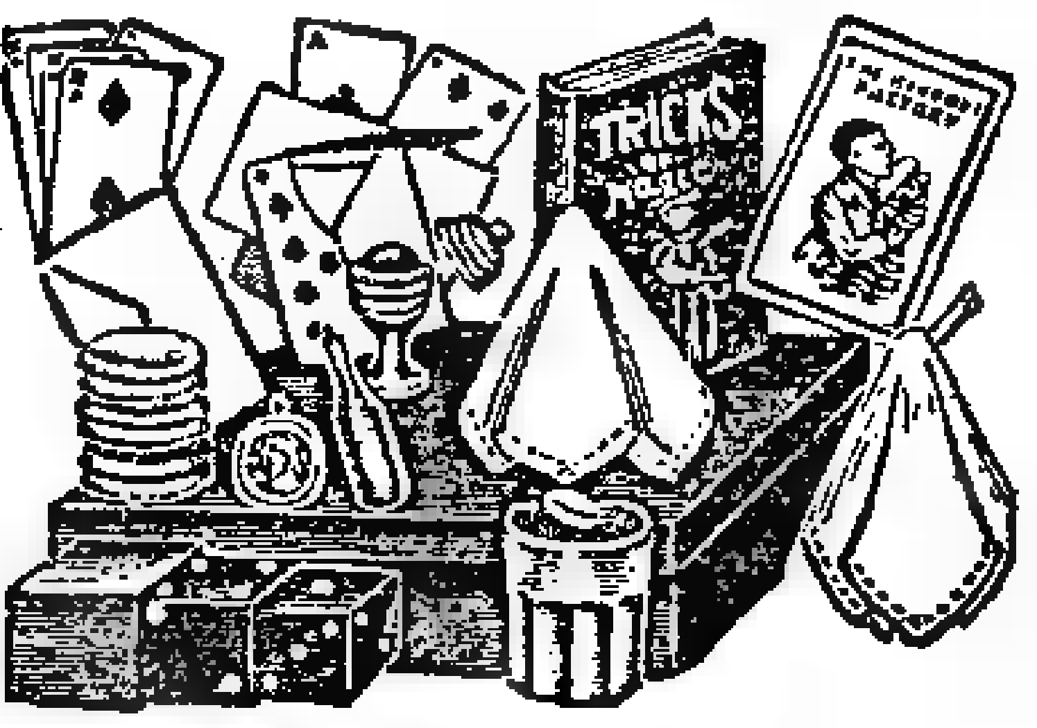
All Sent Postpaid to Any Address for Only 10c

MAGICIAN'S BOX OF TRICKS

Apparatus and Directions for a Number of Mysterious Tricks, Enough for [illegible] Entire Evening's Entertainment........... $1.00

☞ANYONE CAN DO THEM

It is great fun mystifying your friends. Get this Conjurer's Cabinet, and you will be the cleverest fellow in your district. It contains the apparatus for ten first-class tricks, including The MAGIC BALL AND VASE TRICK (a wooden ball is placed inside, and upon replacing the lid has disappeared and is found in someone else's pocket); The HINDOO TRICK CARDS (can be made to change completely no less than five times); DISAPPEARING COIN BOX (a coin, placed in the wooden box, vanishes entirely or changes into a coin of another denomination); The GLASS GOBLET TRICK (a coin is dropped into a glass of water and when the [illegible] is poured [illegible] the coin has vanished and is found somewhere else); the RIBBON FACTORY FROM THE MOUTH TRICK (a seemingly endless supply of colored paper ribbons comes out of your mouth); the DISAPPEARING HANDKERCHIEF (a handkerchief held in the hand mysteriously vanishes); the WIZARD'S RING COIN TRICK; the ENCHANTED BOTTLE (no one but yourself is able to make it lay down); the GREAT HAT AND DICE TRICK (a large dice is placed on top of a hat, disappears, and is found underneath yet no one has touched the hat), and last, but not least, the GREAT PHANTOM CARD TRICK, or two from five leaves nothing. Full instructions are [illegible] for performing each trick. In addition to the above, a number of other feats and illusions [illegible] fully explained for which you can easily make or procure the necessary apparatus. [illegible] complete $1.00 postpaid. JOHNSON SMITH & CO.



BOY ELECTRICIAN Great Book for Boys, Students, Etc.—Only **10c** Postpaid

The HOW and WHY of electricity fully told in simple language that any boy can understand. Scores of plans and instructions for making—dry batteries, dynamos, electric motors, telegraph apparatus, telephones, electric lights, electric door bells, alarms, electric engine, rheostat, mail box alarm, electro-magnets, automatic incandescent flash, electric shocking machine, wireless telegraph apparatus, induction coil, arc light, current reverser, etc., etc. Tells all about electric wiring, static electricity, magnets and magnetism, conductors and insulators, electrostatic induction, the electroscope, the electrophorus, condensers, the Leyden jar, dynamic electricity, the voltaic cell, electromagnets, electrolysis, electro-plating, electrotyping, etc. Also tells how to build [illegible] radio receiving set for a few cents. Nearly 100 illustrations. Sent postpaid [illegible] any [illegible] on receipt of ONLY [illegible], coin [illegible] stamps.

MAGIC MADE EASY

250 MAGIC TRICKS For Parlor or Stage 10c

An excellent little book containing nearly 300 Tricks for parlor or stage. Tricks with cards, coins, handkerchiefs, [illegible] rings, glasses, flowers, thimbles, spoons, bottles, string. Explains the mystery of the floating head and scores of other amazing feats of magic and illusions. Also Second Sight, Shadowgraphy, etc. [illegible] simple a child can perform them. Profusely illustrated. **ONLY 10c.**

125 CARD TRICKS and sleight of hand. Contains all the latest and best card tricks as performed by celebrated magicians, with [illegible] of card tricks used by professional gamblers. **Price 25c**

REPEATING AND SINGLE SHOT AIR PISTOLS

Just what you've always wanted. A powerful high grade Air Pistol, shaped like an Automatic, pocket size. Fires B. B. shot obtainable anywhere. Very powerful yet perfectly safe for boys to handle. Two styles—Single Shot Pistol or Repeater. The Repeater fires 100 shots in one loading. The Single Shot Pistol shoots Air Rifle Darts in addition to B. B. Shot. Well made and durable; all metal parts nickel plated; natural grain wood stocks. Front and rear sights. Weighs about 10 ounces. Better than an air rifle. No license required. **PRICES: Single Shot P[illegible] $2.75, 100 Shot Repeating Pistol $5.00. [illegible] mailable. Shipped by Express only. Not prepaid.**

Shoots B. B. Shots

Little Wonder Crystal Radio Receiver $1

Say what you will about Electrical and Battery Sets, [illegible] CRYSTAL set has them all beat for simplicity and clearness of tone. There is absolutely no noise and no distortion—no batteries to buy—no tubes to wear out—no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Reception is loud and clear. This Receiver is guaranteed to work equal to the most expensive Crystal Set you can buy. Has a receiving radius of over 25 miles, or under favorable conditions up to 100 miles. Constructed of the finest materials throughout, including supersensitive crystal, assuring quick results. PRICE of Receiver only $1.00 postpaid. Or complete with Ear Phone and Aerial Kit—everything all complete—nothing [illegible] to buy, $2.95 postpaid.

Send remittance (Postage Stamps accepted) for all articles listed above, also in our other ad on previous page

JOHNSON SMITH & CO. Dept. 919 **Racine, Wis.**

ALL-WAVE RADIOS
at NEW LOW PRICES

[15 to 560 Meters]

8-TUBE
Long and Short Wave
SUPER HETERODYNE
now only **$18.50**

COMPLETELY ASSEMBLED *with* **LARGE SPEAKER**

30 DAYS FREE TRIAL

Up goes the quality! Down goes the price! Midwest has scored another tremendous hit by bringing the ALL-WAVE radio within reach of every buyer. For only $18.50, radio fans can buy this 8-tube LONG and SHORT wave super-heterodyne chassis, completely assembled with electro-dynamic speaker. Never before such sensational value. Never before so much radio for so little money. Six months ago, such quality and such prices would have been impossible. Think of it! Super power, four distinct wave bands, 15 to 560 meter tuning range, coast-to-coast reception, police calls, foreign reception . . . all for as little as $18.50. Only Midwest radio engineering skill backed by the engineering talent of R.C.A. and Am. T. & T. could produce such sensational radio value. Mail the coupon or write us a postal. You'll be amazed when you get full details.

only $5.00 DOWN PUTS THIS RADIO IN YOUR HOME

What Midwest Owners Say

J. S. Kline, McGeehee, Ark.—"Listened to a set costing $150.00 but would not swap my Midwest for the higher priced one."

A. Edwards, 2125 North A St., Elwood, Ind.—"We wouldn't trade our Midwest for any of the numerous more costly sets."

Emmet Berry, 222 29th St., Ashland, Ky.—"The Midwest cannot be beaten by any other radio that costs twice as much."

Milton T. Lyman, 2525 Merwin St., Shreveport, La.—"Just as good as sets selling for double Midwest prices."

Walter Fahrig, 1304 Highland Ave., Alton, Ill.—"Midwest is the best. Friends think I paid about $300 for it."

H. R. Peper, 436 Ferry St., New Haven, Conn.—"A neighbor of mine who recently purchased a $200.00 radio went home very much dissatisfied after listening to our Midwest."

Deal Direct With Factory---Save UP TO 50%

Midwest sweeps aside the costly old-fashioned way of selling through distributors and dealers. You buy direct from the Midwest factory. You save the middlemen's profits.

Investigate! Mail the coupon. Get the Midwest catalog. Learn the facts about the new Midwest 8-tube ALL-WAVE sets—also 6-tube sets, Battery sets and new Automatic Record Changing Radio-Phonograph at an extremely low price. Learn about our sensationally low factory prices, easy payment plan and positive guarantee of satisfaction or money back. Get a bigger, better, more powerful, better toned radio—at a positive saving of 30% to 50%!

MIDWEST RADIO CORP.
(Est. 1920)
Dept. 204 Cincinnati, Ohio

MAIL THIS COUPON *Now!*

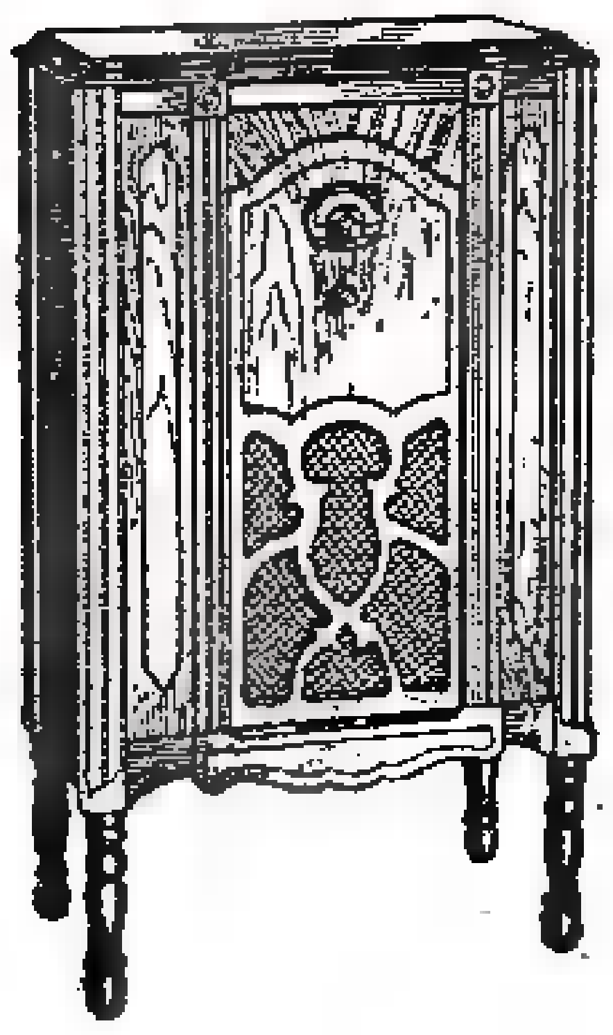
Midwest Radio Corp.
Dept. 204
Cincinnati, Ohio.

Without obligation on my part send me your new 1933 catalog, and complete details of your liberal 30-day free trial offer. This is NOT an order.

Name.........................
Address................................
Town ....State........

NEW CONSOLE MODELS AS LOW AS $21.95

COMPLETE WITH TUBES



Also amazing new long wave console radio at a sensationally low price. Six new type tubes, dynamic speaker, automatic volume control and other new up-to-the-minute features found in sets selling for $75.00 to $100.00. Don't buy any radio until you get all the facts Mail the coupon or write us a postal now.

BLUEPRINTS *New PLANS for the Shop Worker*

Get your copy of Modern Mechanix and Inventions' big Blueprint Book—it's free! Projects shown in the book are the most popular how-to-builds run by the magazine, and on every one of them large size, genuine blueprints are available at low cost, making it easy to build the items in your own shop. Boats, airplanes, trailers, home built autos—take your choice from these and scores of other subjects! Thousands of Modern Mechanix and Inventions projects have been built from these blueprints; they're the cream of all how-to-build articles published during the past five years. A few of the plans are listed below:

NEWEST PLANS

ESKIMO KYACK—Simple little one-man rough-weather canoe, completely covered except for space where paddler sits, making it practically impossible to swamp. Construction is simple, layers of tough kraft paper, bound with varnish, being used for covering. Tested and designed by Sam Rabl. Price of blueprints **$1.00**

DIVING HELMET—With this helmet, constructed of odds and ends which cost but a few cents, you can explore lake bottoms as deep as 30 feet. A fascinating new world opens up before your eyes. Money can be made with it, too, recovering outboard motors and other objects lost in the water. Blueprints **$1.00**

ELECTRIC REFRIGERATOR—Blueprints show you exactly how to construct an electric refrigeration unit, and printed directions supplement the diagrams. At a cost of around $40 you can construct an electric unit for your icebox that serves as efficiently as a manufactured model costing five times as much. Blueprints . . **$1.50**

SCRAM—Newest addition to the boat plan list. She is 15½ feet of dynamite, inboard motored—will do around 40 with Ford A engine. Forward and aft cockpits, with motor between. Can be built in a garage, and is a flashy performer. Prints include drawings for marine conversion of Model A Ford motor. Blueprints **$3.00**

AUTOS

BUNGALOW TRAILER — The most popular trailer design ever published; thousands have been built. Two wheeled, folding design—folds together compactly for traveling, can be opened up in camp. Weatherproof; built-in beds for four adults; running water, household comforts. About $30 should build her—much less, if you have a few parts lying around. Wheels and axle from most any discarded car chassis will do. Blueprints **$1.00**

M-M SPORT ROADSTER—Custom-built to your own fancy! Four-cylinder motorcycle engine, chain drive, wood frame, Model T Ford differential unit, four wheel brakes. With these cheaply acquired units, the car does 65 m.p.h. Body of fabric construction, easy to work. Blueprints **$2.50**

M-M SPEEDSTER BODY—Racing body for a Model T Ford or similar chassis. Wooden frame, wire covered, then a layer of cotton batting held down by imitation leather. Blueprints **$1.00**

AIRPLANES

AIR CAMPER—Pietenpol's masterpiece, the most popular light plane for amateur construction ever designed. Two place, model A Ford motor, high-wing monoplane. Costs $500 to build, including motor. Thoroughly tested out in cross-country service. Prints give conversion details for Model A motor. Blueprints **$7.50**

SKY SCOUT—A smaller Air Camper, single place, using Model T Ford engine. Designed for easy building, safety rather than speed. Wood fuselage. Blueprints . . **$4.00**

GERE SPORT BIPLANE—The leading light biplane design. Suitable for Model A Ford motor. Single place, rarely beautiful in appearance; an Army pursuit plane in miniature. Steel fuselage. Blueprints **$5.00**

BOATS

PUNKIN SEED—An 11-foot hydroplane that cleans up in competition with the right outboard on her stern. Capable of 45 m.p.h. Concave V-bottom with one step. Blueprints **$1.00**

WHIZZER—An air-drive speedster, one step scow type hydroplane, driven by air propeller at rear with motorcycle engine. Motor should be of at least 20 h.p., not over 125 pounds weight. Blueprints **$1.00**

DOROTHY—A John Hanna design, auxiliary cruiser with 10 h.p. motor, two sail plans. Two berths, five-foot headroom in her 24-foot hull. A deep water boat by a master designer. Blueprints . . . **$2.50**

GANNET—24-foot cruiser with bunks for two, complete galley, nicely boxed-in Ford engine installation. A very popular design by Charles Hall. Total cost, including motor, from $300 to $500, depending on locality. Blueprints **$2.00**

CANVAS CANOE—By Chester Nedwidek. Length, 16 ft., planking of 5/32 in. cedar covered with No. [illegible] canvas. $15 should turn out the complete job. Blueprints **$1.00**

DOROTHY AN AUXILIARY CRUISER
ELECTRIC REFRIGERATOR
WHIZZER AN AIR-DRIVE SPEEDSTER
BUNGALOW CAMP TRAILER
SHORT WAVE CONVERTER
AIR CAMPER 2 PLACE FORD MOTOR
LOG CABIN
SPEEDSTER BODY
KYACK
DIVING HELMET
OUTBOARD RACER
BLUEPRINTS
BOATS
LIGHT PLANES
TRAILERS
MIDGET AUTOS
MOTORS
RADIOS
MODERN MECHANIX AND INVENTIONS

MODERN MECHANIX AND INVENTIONS, 529 S. Seventh Street, Minneapolis, Minn.

Gentlemen: Please send me my copy of the big new Blueprint Book by return mail. This comes to me without the slightest obligation.

I enclose $. . . . . in payment for blueprints of. . . . .
(Note: This form can be used if you wish any of the prints listed above without waiting for the descriptive booklet.)

Name . . . .

Address . . . .

City . . . . State. . . . .

Genuine
UNDERWOOD
Below ½ Mfg's. Original PRICE
(Refinished)

New Low Price! Now Only $39⁹⁰ Cash
Regular $102.50 Model
Easiest Terms Ever Offered

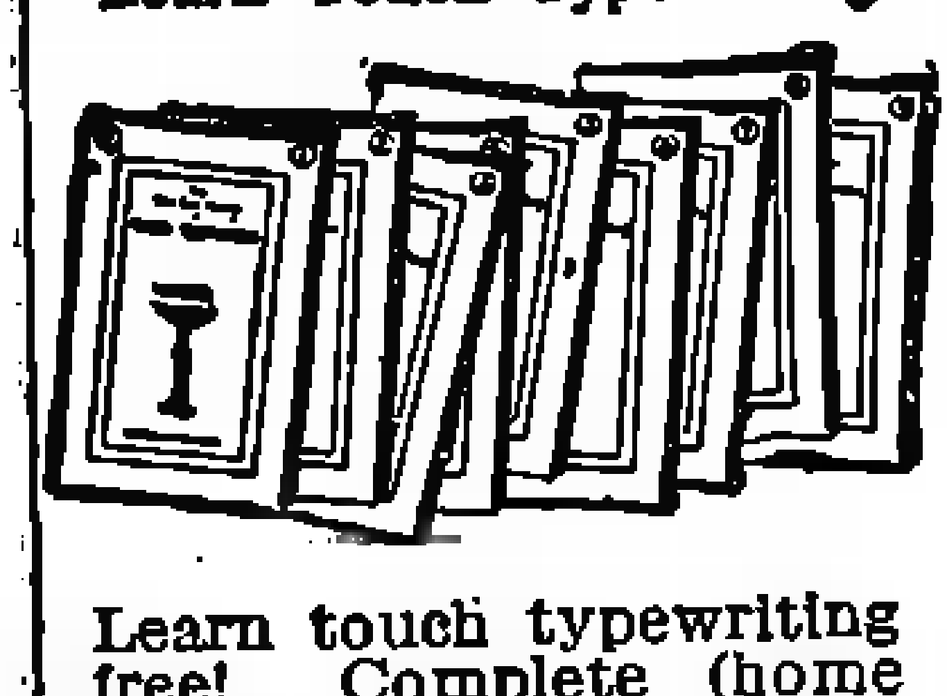
Famous Model No. 5
NOW ONLY $1 DOWN

Think of it—over 2 million buyers paid $102.50 (cash) for this model No. 5 now offered direct-to-you at way below ½ original price—and on easiest terms besides. Positively the greatest bargain ever offered. Accept the special 10-day trial offer and be convinced. See the neat, perfect work it does—compare its bright, shiny newness without risk. Recognized as the *finest, strongest* typewriter built.

Easy Terms—only 10c a day

Here is positively the chance of a lifetime to own a World-famous Standard Underwood No. 5 completely refinished at the very lowest price and easiest terms. All complete with modern improvements including standard 4-row keyboard, back spacer, automatic ribbon reverse, shift lock, 2-color ribbon, etc. Ideal for business and professional men—teachers, students, story writers, etc. Don't let this chance pass by.

Learn Touch Typewriting



Learn touch typewriting free! Complete (home study) course of famous Van Sant System given with this offer. Fully illustrated—easily learned.

10 Day Trial

You save over $60 by quick action. These genuine guaranteed Underwoods now only $39.90 (cash) while limited supply lasts. Only $1 down brings the Underwood for 10 days' trial. If you keep it—only 10c a day soon pays for your Underwood on our new low price and easiest terms. Send at once before this special offer is withdrawn. Remember every machine fully guaranteed and sent on 10 day trial.

International Typewriter Exchange
231 W. Monroe St., Chicago, Dept. 405
I enclose $1 deposit. Send Underwood No. 5 (F.O.B. Chicago) at once for 10 days' trial. If I am not perfectly satisfied I can return it express collect and get my deposit back. If I keep it I will pay $3 a month until I have paid $44.90 (term price) in full.

Name .... Age......
Address ....
Town .... State..............

ANDY'S SHOP MAIL BOX

(Continued from page 23)

¼" bolt, threaded all the way down, in the top of the spindle—this I used to hold a ⅛" disc of plywood padded with felt the same size of the turntable to place the disc of emery cloth or sand paper (whichever is preferred to be used) upon and clamped with a 16-gauge 1½" diameter steel plate with the tap.

I used a drive belt from a ¾" drive shaft over the 6" pulley—and, Oh Boy, does she do the work. I know there are many mechanics who are airplane builders, or would be, that would glory to have one of these machines.

If any of the bugs want a blueprint of it, I will send it to them if they will write me.

I learned to fly in 1929 and must have bought one of the first issues of the Flying Manual. I don't remember of seeing any before then, and have bought one each year since then. They are what the young bunch of red blooded American nuts really need—keep right on impressing them about their flying before trying to solo or test their ships. I still have nuts or rather overconfident men thinking they have the ability and nerve to do anything to tell me they will bet every cent they have that they can fly an airplane without previous time. Of course, I am not going to call their bet and let them have a ship to commit suicide with. So keep the impression on their minds—there are plenty of fools yet in the world.

Guess I had better close this racket and let you rest. As ever, a friend to Andy.

T. W. Ball,
Box 400.

* * *

Here's an interesting little car made by Seph Holmes. Read what he has to say about it:

511 E. Culver St.,
Phoenix, Ariz.

Dear Sir:

Your magazine sure has made a big hit with me. Enclosed you will find a picture of the Humblebug built by myself. It's powered with a gasoline washing machine affair and will hit up to 25 m.p.h. wide open. This picture shows just the frame. It's a swell looking little car with all the fixins such as the dummy hood and radiator and the turtle back, etc. It only cost $12.00 complete and is a bus worth the money.

So Long,
SEPH HOLMES.

* * *

Well, well, well, and a coupla more holes-in-the-ground. Here is Bobby Retz, comin' right back with another sweet little light flugzeuger:

Farmland, Ind.

Dear Andy:

Inclosed are some snaps of my latest Sport Biplane. It is of similar design to the one which took third place in the M. M. Light Plane contest, but has much better performance and looks as you can see from the photos.

I used an Anzani 60 and suped it up to approximately 75 h.p. by putting in new pistons and letting it turn up to 1800 r.p.m. This

(Continued on page 30)

When

Doors Won't Open
Furnaces Don't Heat
Faucets Drip
Windows Stick

—Fix Them Yourself

In these times when pennies count, many home owners put up with the inconvenience of household devices which don't operate at full efficiency because they hesitate to run up a big bill with the repair man. Wise householders make their own small repairs—and big ones, too—enjoying the full efficiency of their homes and keeping dollars in their pockets to spend for other things. Any handy man will find it no trick at all to repair plumbing, plaster, concrete, electric equipment, etc., following the explicit directions in the

Handy Man's Home Manual

This book, just off the press, answers just the questions you would ask of an expert if he stood at your side to advise you on your repair job. It is, in fact, the work of many experts, specialists in their fields. The numerous photographs, explicit drawings and clear, easily understandable text reduce the problem of household repairs to such simple terms that no man who can handle a hammer and saw need be fearful of his ability.

Now on Sale at
All
Newsstands

PRICE 50c

If your news dealer is sold out, send 50 cents to Fawcett Publications, Inc., 529 South Seventh Street, Minneapolis, Minn., and a copy of the Handy Man's Home Manual will be sent to you at once.

HANDY MAN'S HOME MANUAL
HOW TO FIX
HOW TO MAKE

Greaseless!

LET DO-NUTS pull you out of the hole!

—not the old-style fried "sinkers", but the new fast-selling GREASELESS do-nuts baked by electricity, with the Ringer Do-Nut Machine.

A steady cash income in your own business
Men and women in all parts of the country, in small towns and large cities, are earning good steady incomes making these delicious, healthful do-nuts. They are large, round, tempting—a big value that appeals to all. Simple to make—no experience necessary. BIG PROFITS—They bring in from TWO to THREE times the cost of ingredients.

"Selling to Nearly 150 Restaurants"

"I am making between 300 and 400 dozen a week on two Ringer Do-Nut Machines. I am selling to nearly 150 restaurants and lunch cars. I made up my mind that I would make a good big profitable business out of it, which I think I did." Wm. V. Everman, Jr., Penn.

"My Machine Has Ended My Worries"

"My Ringer Do-Nut outfit has ended my worries. I do wholesale business only. It is an easy matter to put greaseless do-nuts in a store. I have about 50 stores and they sell altogether around 80 dozen a day. I get 25c per dozen." Arthur Rabenort, Illinois.

Sells to Chain Stores

Mrs. Ryan of Ohio writes: "We furnish A. & P. stores in three cities—also most of U. S. stores here, besides several routes of our own. Have wired you for another do-nut machine. Now working 24 hours a day."

NO CANVASSING NECESSARY

Stores and eat shops buy all you can make. Or you can sell by people on commission basis. You can start with only $25. Our easy payment plan helps you finance your business. **FREE PLANS** show you how to begin making money at once. Send coupon or penny postcard for details. No obligation—no salesman will call. Write Ringer Do-Nut Co., 193 Main St. N. E., Minneapolis, Minn.

START AT HOME IN SPARE TIME
Mail This Coupon NOW!

RINGER DO-NUT COMPANY
193 Main St. N. E., Minneapolis, Minn.

Please send me Free Plans and full information about the Ringer Do-Nut Machine.

Name ....

Address ....

City .... State...........

Spare Time Training

that helps you

Beat the Depression!

DO YOU want to beat the depression—take advantage of it—use it to make your job safer now and success easier in the future? You can do it.

Depression weeds out the unfit—but opens unusual opportunity for the trained man. Business is harder—demands more—looks more carefully for ability. The trained man is surer of his job *now* and he is ready for the many opportunities sure to come with returning good times.

If you wish this advantage, simply mark on the coupon the field of business in which you are most interested. We will send you full information about the opportunities in that field, tell you how our complete success-building program helps you plan your future, trains you in your spare time, and works with you all through your career. Send the coupon NOW.

Find Yourself Through LaSalle

La Salle Extension University
Dept. 4493-R Chicago

Please send me full information regarding the success-building training and service I have marked with an X below. Also a copy of "Ten Years' Promotion in One"—all without obligation to me.

- ☐ **Business Management:** Training for Official, Managerial, Sales and Departmental Executive positions.
- ☐ **Modern Salesmanship:** Training for position as Sales Executive, Salesman, Sales Trainer, Sales Promotion Manager, Manufacturer's Agent, and all positions in retail, wholesale or specialty selling.
- ☐ **Higher Accountancy:** Training for position as Auditor, Comptroller, Certified Public Accountant, Cost Accountant, etc.
- ☐ **Traffic Management:** Training for position as Railroad or Industrial Traffic Manager, Rate Expert, Freight Solicitor, etc.
- ☐ **Law:** LL. B. Degree.
- ☐ **Banking and Finance:** Training for executive positions in Banks and Financial Institutions.
- ☐ **Modern Foremanship:** Training for positions in Shop Management, such as that of Superintendent, General Foreman, Foreman, Sub-Foreman, etc.
- ☐ **Industrial Management:** Training for Works Management, Production Control, Industrial Engineering, etc.
- ☐ **Personnel Management:** Training for Personnel Manager, Industrial Relations Manager, Employment Manager, and positions in Employee Service.
- ☐ **Modern Business Correspondence:** Training for Sales or Collection Correspondent, Sales Promotion Manager, Mail Sales Manager, Secretary, etc.
- ☐ **Stenography:** Training in the new superior machine shorthand, Stenotypy.
- ☐ **Railway Station Management**
- ☐ **Railway Accounting**
- ☐ **Expert Bookkeeping**
- ☐ **Business English**
- ☐ **Commercial Law**
- ☐ **Credit and Collection Correspondence**
- ☐ **Paper Salesman's Training**
- ☐ **Public Speaking**
- ☐ **C. P. A. Coaching**
- ☐ **Commercial Spanish**
- ☐ **Office Management**
- ☐ **Food Store Management**

Ten years promotion in one

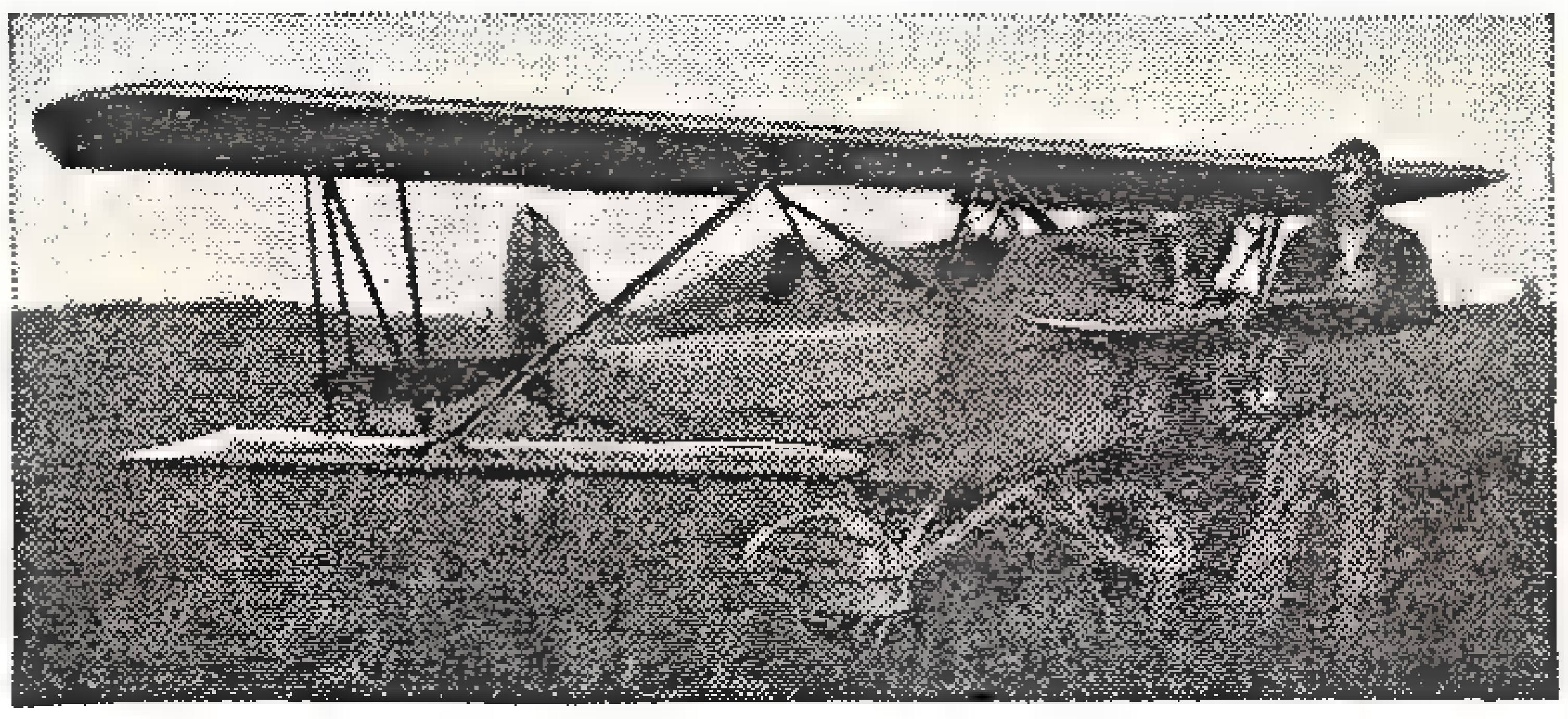
*Name*________________________ *Age*_____

*Present Position*________________________

*Address*________________________

ANDY'S SHOP MAIL BOX

(Continued from page 28)



This is Robt. Retz' latest biplane job. He describes her in a letter in this column.

gave the ship a top speed of about 140 m.p.h. The plane lands at about 50 m.p.h.

The wings and fuselage are wood construction while the landing gear, motor mount and tail units are welded steel.

The parts are made of welded steel tubing covered with cloth and doped. The motor is streamlined with aluminum so as to reduce drag and make the plane look better.

As you will note the wing bracings are of trussed steel streamline tubing, and no wires are necessary.

If any of the fellows are interested in the constructional details and will inclose a stamped self-addressed envelope I will be glad to give them some of the inside dope. Also I am interested in corresponding with all amateurs and exchange dope.

Yours truly,
Robt. Retz.

* * *

You who are contemplating an auto tour this summer, hearken!

Next issue we're running plans for a swell *Cruise Trailer,* and this time it's a four wheeler.

Last year old Dick Cole designed us a folding two-wheeler which was built everywhere from Alaska to the Transvaal, and possibly five hundred in number.

Well, this year we enlisted the services of an expert boat designer who knew how to put up accommodations in small space, and we have the *Cruise Trailer* by Westy Farmer coming for next issue.

This new trailer is a bit more elaborate, and will not cost much more to build than last year's model. Being a four-wheeler there is room for two bunks of the studio couch variety, a clothes closet, and galley, and toilet facilities. There is a world of interest here—get the next issue. So long! —Andy.

No Wind Can Blow It Out

SELF STARTING LIGHTER

SOMETHING DIFFERENT

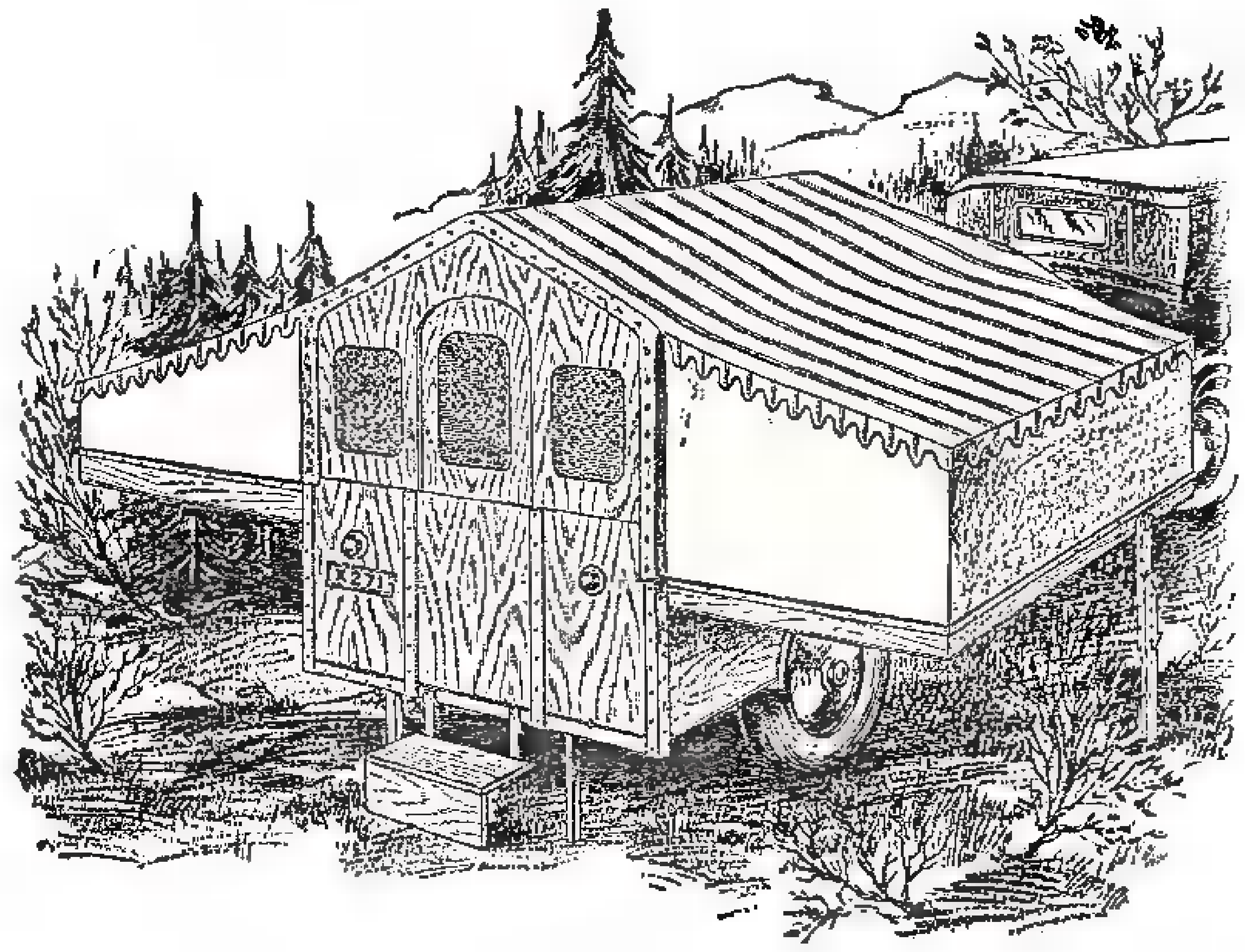
MYSTERY CIGAR LIGHTER

MAKE UP TO $5 A DAY

New scientific marvel that amazes everyone. LOGICAL SUCCESSOR TO THE FLINT LIGHTER. No flint—no friction—a brand new ignition principle. Every demonstration a sale. Sample and money making sales plan 25c and $2.50 per dozen. Gold, Silver or chromium plated sample 50c. AGENTS—Get details on this money-maker.

NEW METHOD MFG. CO.
Desk M-4 New Method Bldg. Bradford, Pa.

Build This GYPSY Trailer for Vacation Time!



This Bungalow on Wheels

- *—sleeps four adults*
- *—costs $30 or less to build*
- *—folds up to car width when on the road*
- *—carries all household equipment, including running water and built-in beds.*
- *—is completely weatherproof*
- *—can be set up anywhere.*

NO WONDER this trailer has proved to be the most phenomenally popular how-to-build project in years! Literally hundreds of them have been built since the plans originally appeared in the May, 1932, issue of Modern Mechanix and Inventions. The illustration above shows the outfit in camp for the night, unfolded as a house. For traveling, the side balconies are folded inward, the roof top down, and presto! you have an easily towed trailer which allows complete vision from the rear window of your car.

Chassis of the trailer is built up out of the front axle unit of a junked car—almost any type will do. Only ordinary tools are required. Roof is of waterproof canvas. Bedsprings are contained in the projecting balconies. Provision for running water and household equipment is made.

BLUEPRINTS show the trailer layout with all dimensions. Prints are large size, specially made for shop use, easy to read. Any man who can tell a hammer from a saw can put this trailer together to last for years. Price of blueprints, postpaid $1.00

Modern Mechanix and Inventions
529 S. Seventh St. Minneapolis, Minn.

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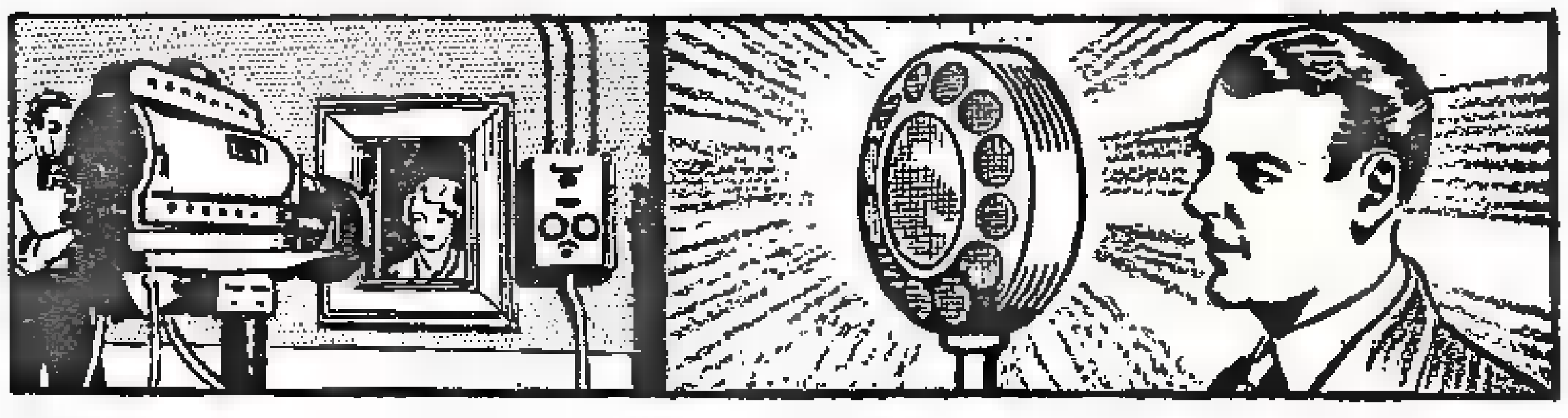

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Own the snappiest boat afloat!

. . . the 18 lb. *nonsinkable* MEAD "KI-YAK"! You can assemble it in three days from our cut-to-fit "Ki-yak Kit" for only $11.75 ($6.50 starts you!). Are you going to "hang around" on shore and try to "bum rides" this Summer, or are you going to be the envy of all your friends by owning this graceful, speedy craft? For sheer beauty of line, speed, and safety, the MEAD "KI-YAK" stands alone; there is nothing else comparable to it on the market. You can lift it with two fingers; you can carry it on your bicycle! It will carry you in three inches of water. It rides the breakers like a Hawaiian surf-board.

WE HAVE A REAL MONEY-MAKING PROPOSITION for the first Ki-yak owner in each town. Don't let your neighbor get the jump on you; write for full information right NOW! (Enclose a dime to cover postage and circulars.)

MEAD GLIDERS
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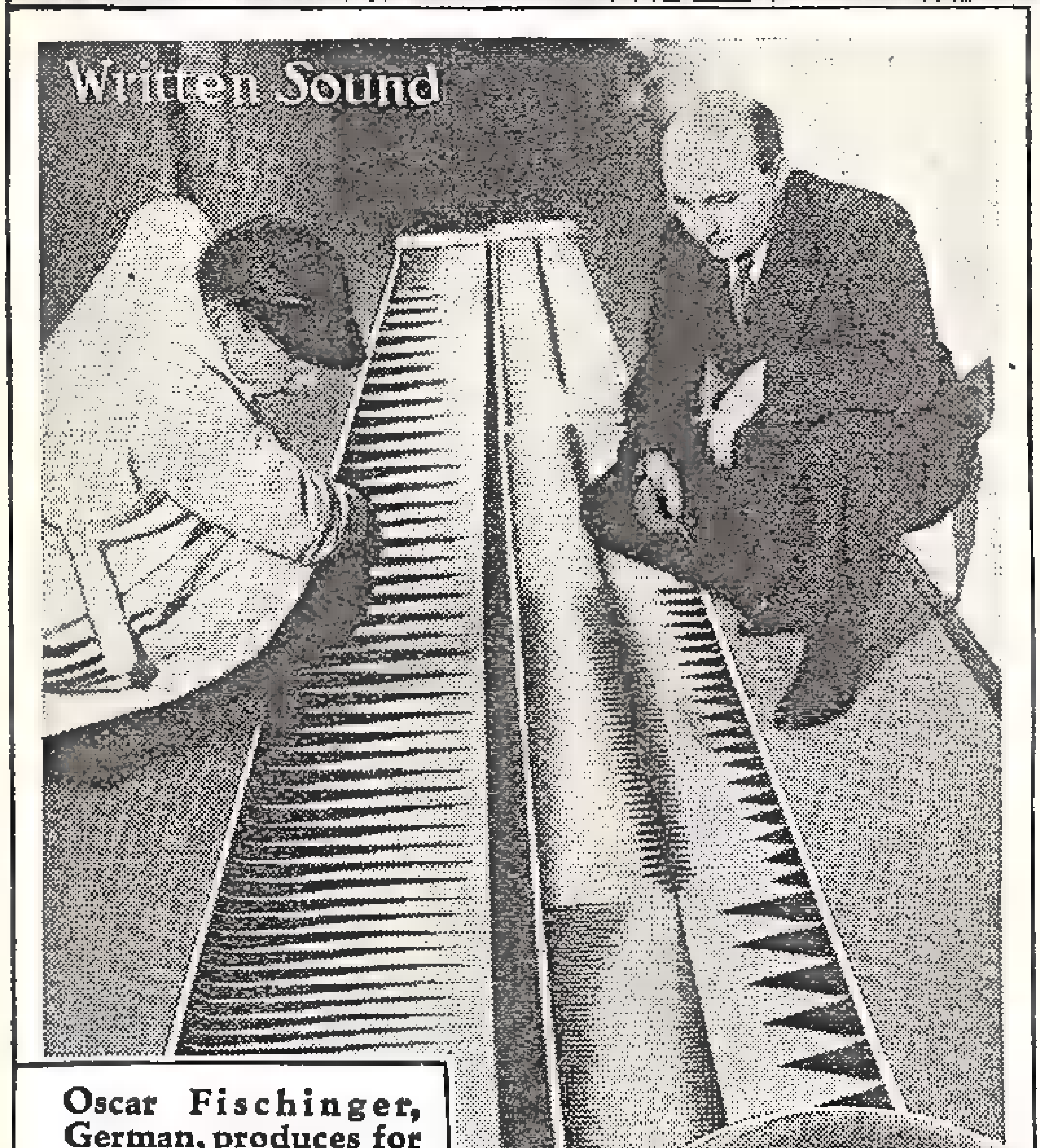
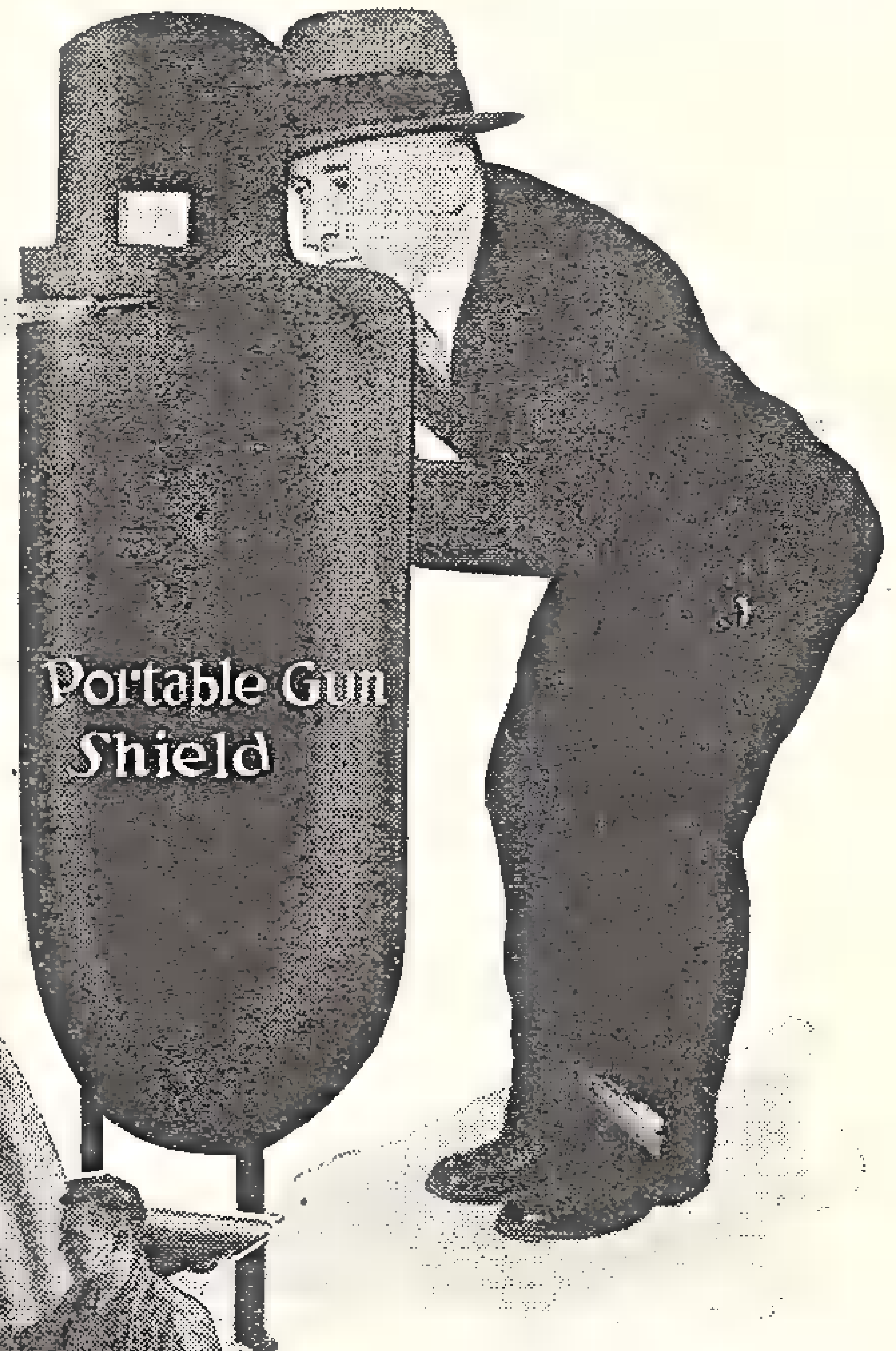
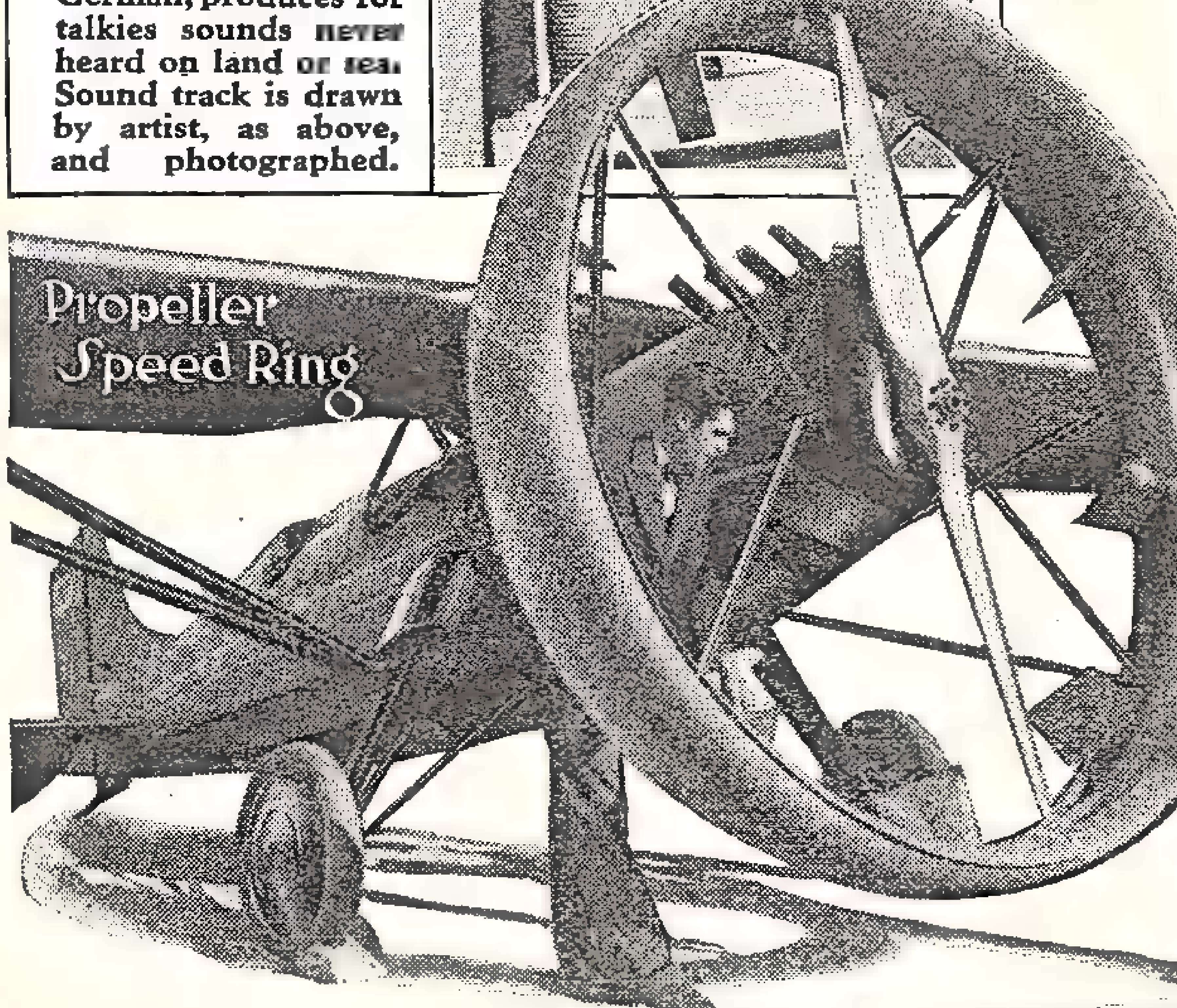
NEW IDEAS *of*

In the World of

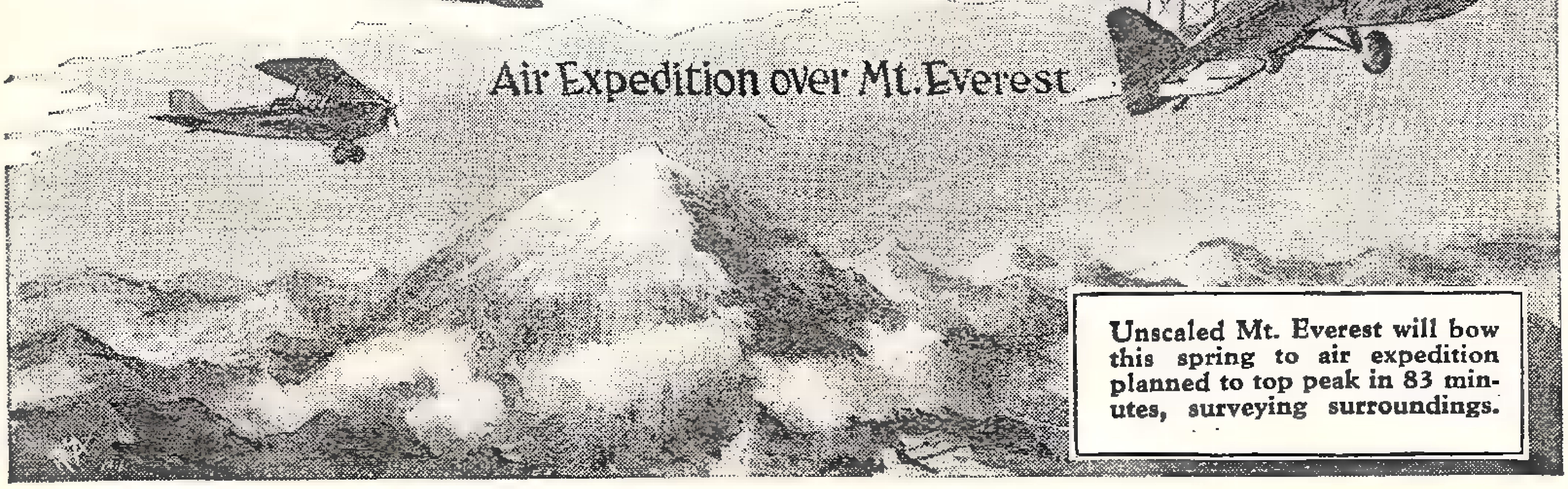

Written Sound

Oscar Fischinger, German, produces for talkies sounds never heard on land or sea. Sound track is drawn by artist, as above, and photographed.


Portable Gun Shield


Propeller Speed Ring

Miscreants are expected to flee in terror when police approach with portable shield, above. Left, ring around propeller increases controllability and speed of planes.


Air Expedition over Mt. Everest

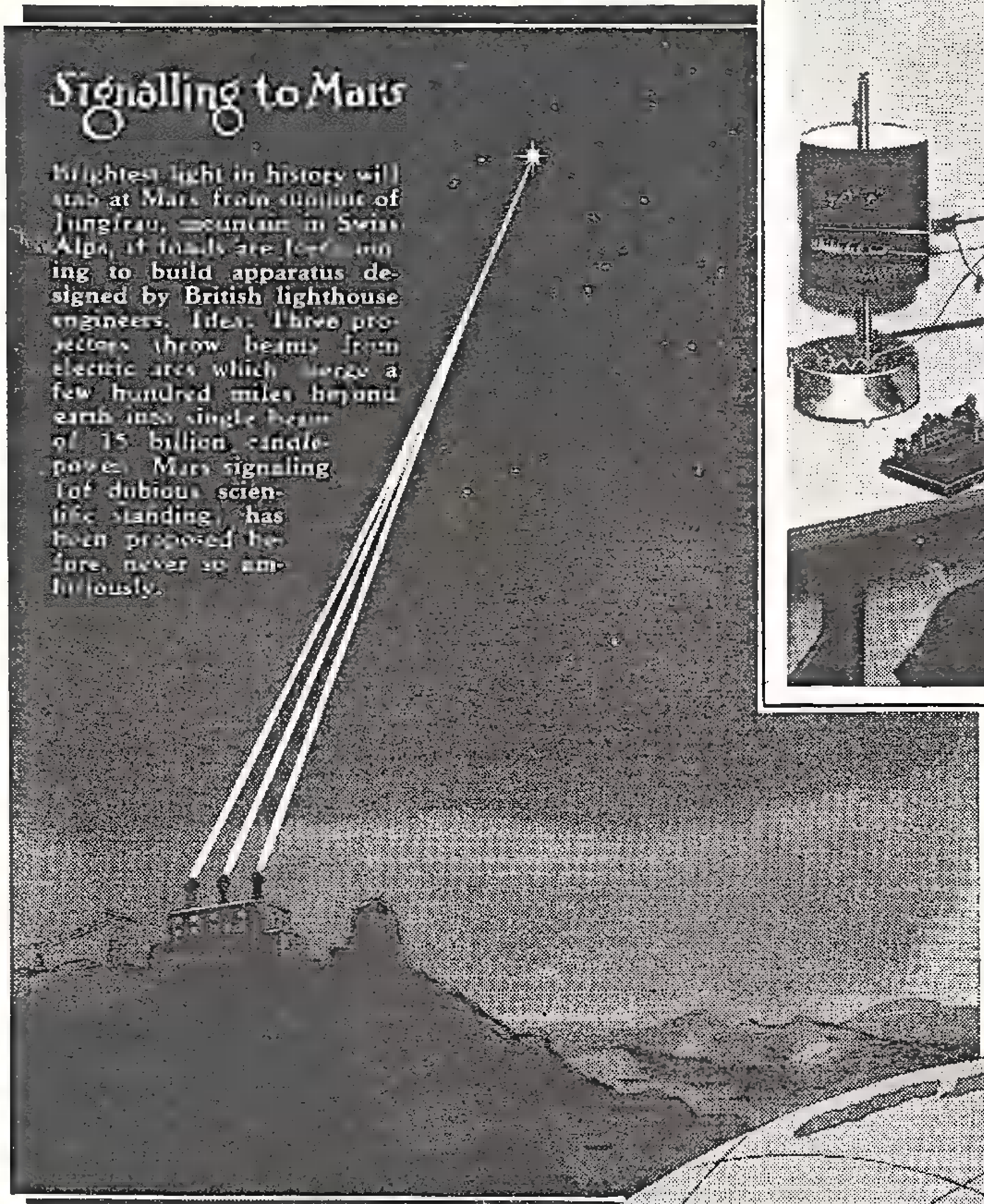
Unscaled Mt. Everest will bow this spring to air expedition planned to top peak in 83 minutes, surveying surroundings.

AND INVENTIONS

MINNEAPOLIS, MINNESOTA — APRIL, 1933

THE MONTH

Science and Invention

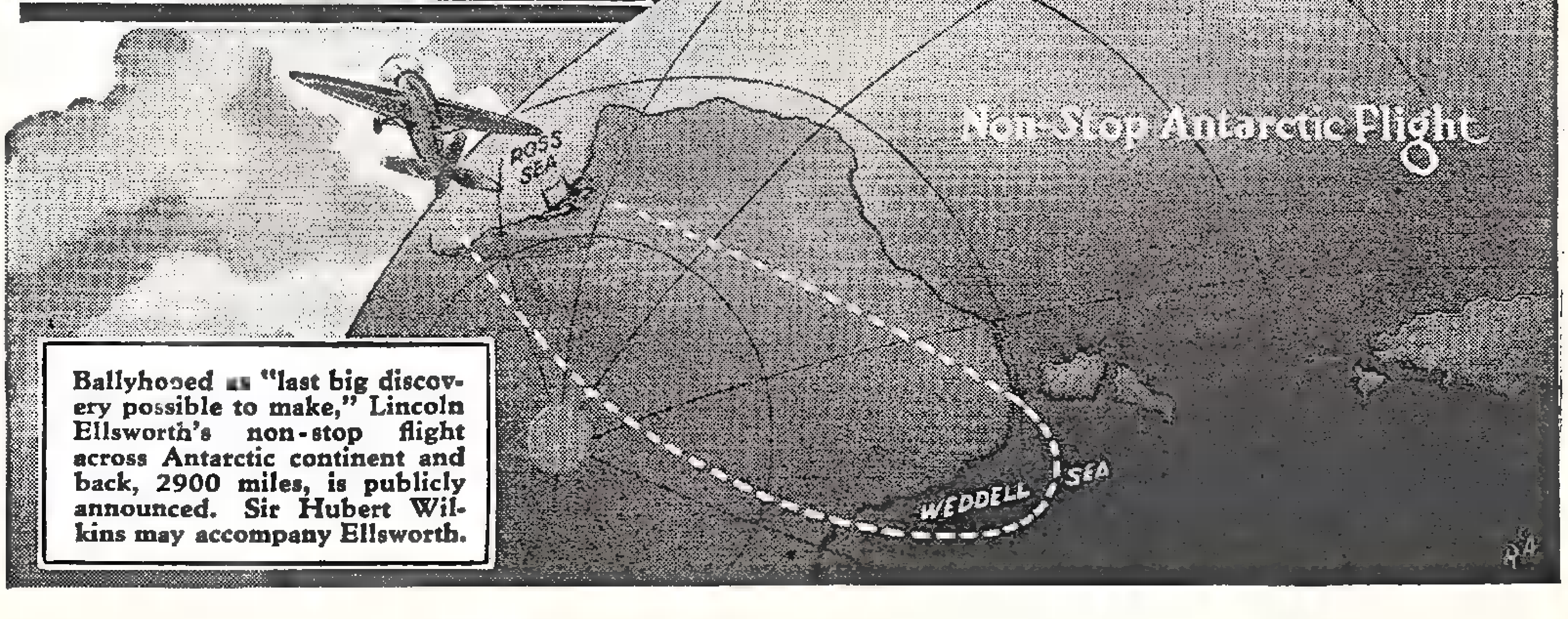


Signalling to Mars

Brightest light in history will stab at Mars from summit of Jungfrau, mountain in Swiss Alps, if funds are forthcoming to build apparatus designed by British lighthouse engineers. Idea: Three projectors throw beams from electric arcs which merge a few hundred miles beyond earth into single beam of 15 billion candlepower. Mars signaling (of dubious scientific standing) has been proposed before, never so ambitiously.

Giggle Gauge

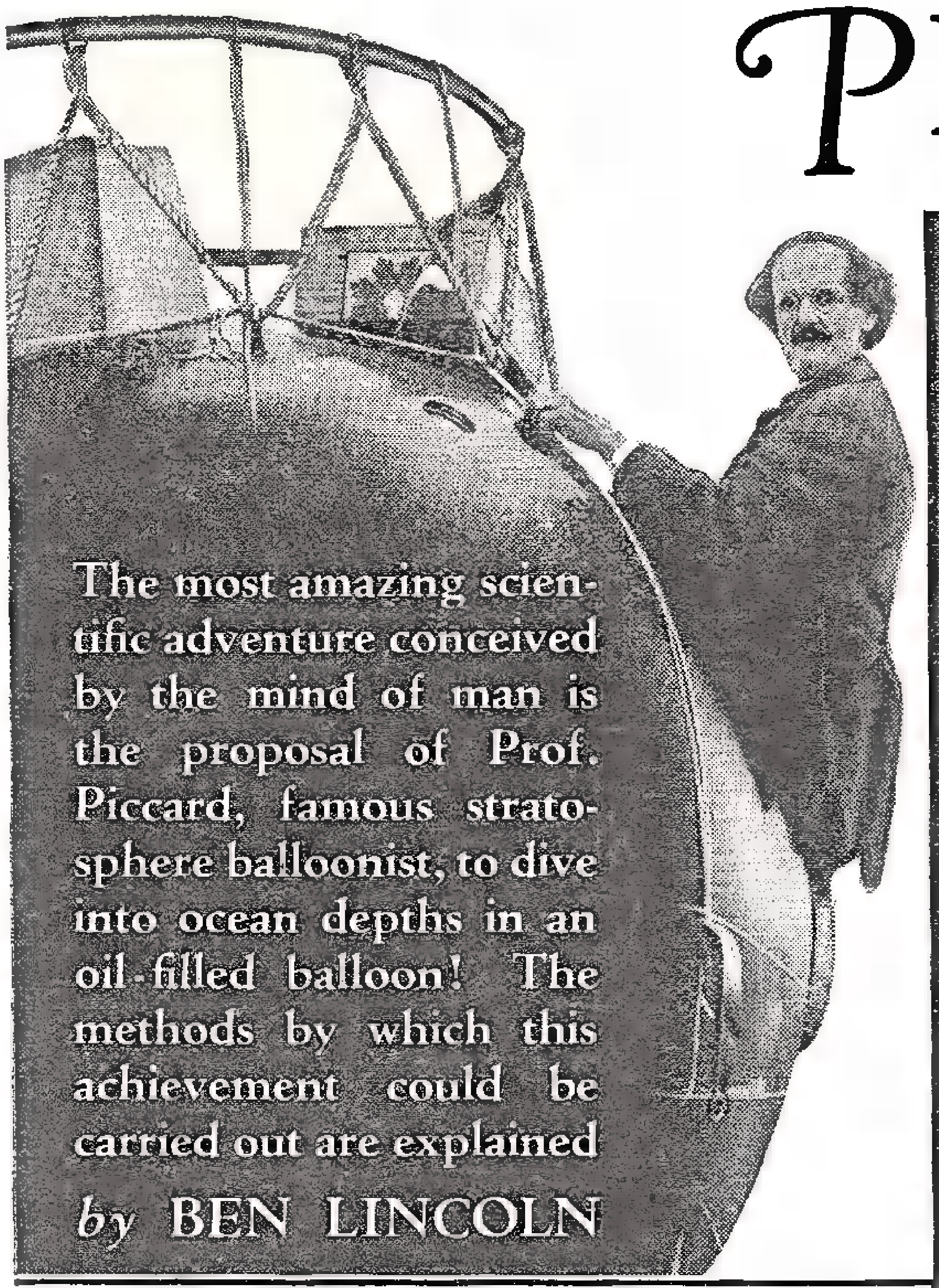
Risibilities of Miss Helen Foder are registered in peaks and valleys graphed by giggle gauge, more formally described by Dr. S. L. Crawley, Cleveland psychology professor, as an instrument for testing hilarity capacity. Device records fluctuations of pulse and heart beat accompanying changes in emotions. Comedy-proof subjects produce a graph of rolls and curves; graphs of less sober-minded resemble cross section of Alps.



Non-Stop Antarctic Flight

Ballyhooed as "last big discovery possible to make," Lincoln Ellsworth's non-stop flight across Antarctic continent and back, 2900 miles, is publicly announced. Sir Hubert Wilkins may accompany Ellsworth.

PICCARD'S



The most amazing scientific adventure conceived by the mind of man is the proposal of Prof. Piccard, famous stratosphere balloonist, to dive into ocean depths in an oil-filled balloon! The methods by which this achievement could be carried out are explained

by BEN LINCOLN

Prof. Piccard entering gondola on stratosphere flight.

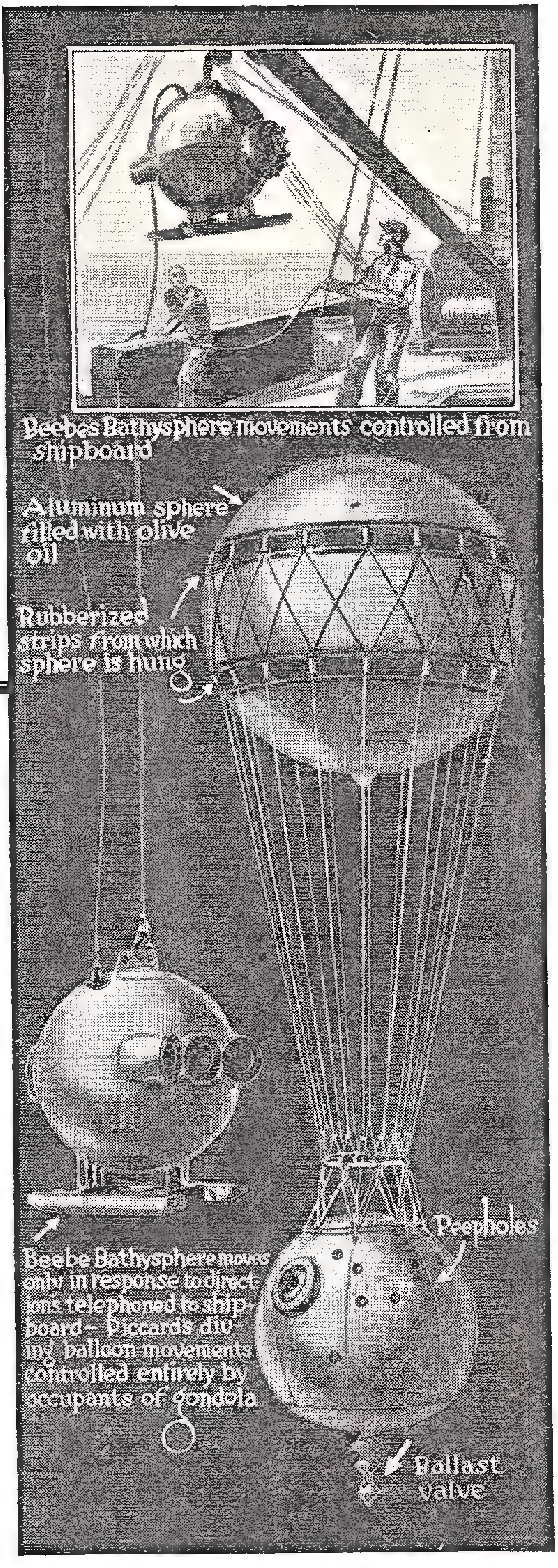
SURPASSING the most fantastic undertaking ever projected in the name of science, and rivaling the fictional exploits of Jules Verne heroes, is the secret project planned by Prof. Auguste Piccard, details of which are revealed here for the first time exclusively for readers of MODERN MECHANIX AND INVENTIONS.

Already a world-wide hero in his own right for his explorations of the stratosphere in a balloon, the proposal of Prof. Piccard must be accorded the sober consideration to which his astounding achievements in the world of science already entitle him.

In short, Prof. Piccard's plan, truly the most astonishing idea brought forth in years, is to descend into unplumbed depths of the ocean in a balloon but little different from the one which carried him eleven miles into the air last summer!

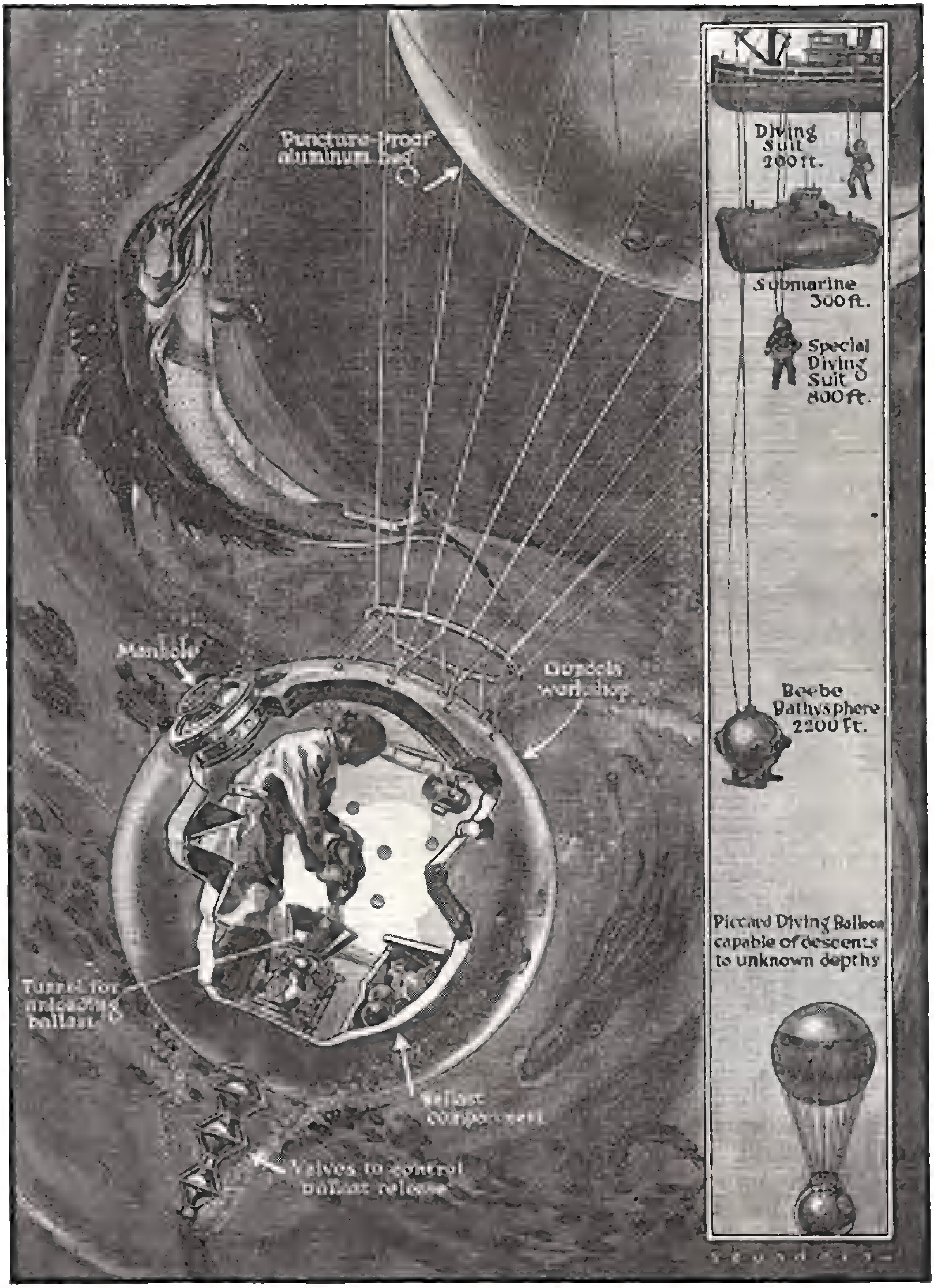
Impossible? Apparently—until you realize how thoroughly Prof. Piccard has gone into the matter, and how completely he has overcome obstacles. It is Prof. Piccard's most cherished ambition to explore the ocean floor in his diving balloon, below the 2000 to 3000 foot depths to which William Beebe has penetrated in his Bathysphere.

The idea is far from a new one to Prof. Piccard. Twenty years ago, while at the University of Zurich, he first planned an ocean-bottom exploration, but the war prevented. But the undersea balloon voyage was never abandoned. His decision to make a stratosphere flight rather than a


Beebes Bathysphere movements controlled from shipboard
Aluminum sphere filled with olive oil
Rubberized strips from which sphere is hung
Peepholes
Beebe Bathysphere moves only in response to directions telephoned to shipboard— Piccards diving balloon movements controlled entirely by occupants of gondola
Ballast valve

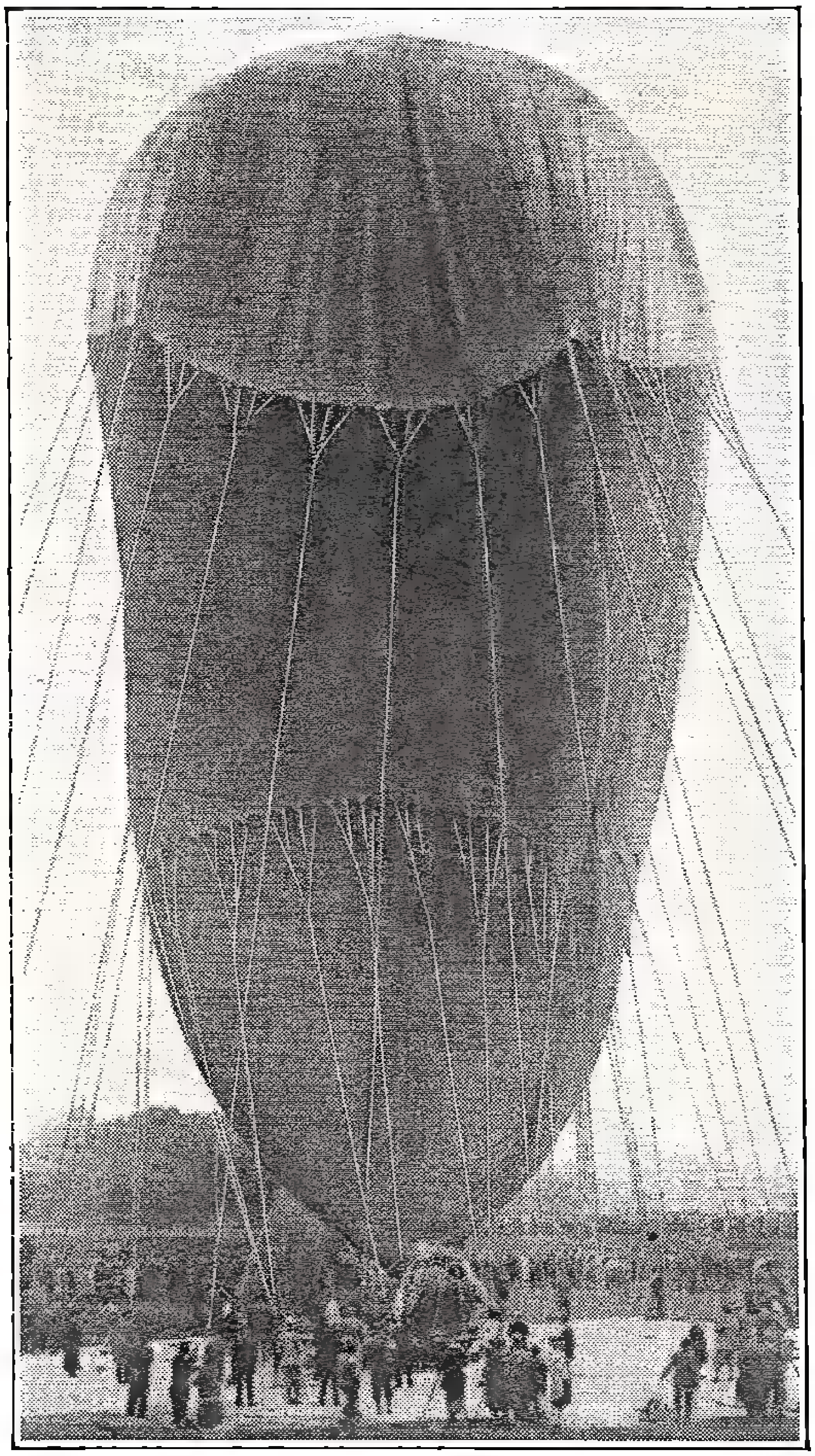
Comparative performances of Beebe Bathysphere, Piccard sea balloon. Advantage of latter is control from within.

Ocean-Diving BALLOON


Puncture-proof aluminum bag
Manhole
Gondola workshop
Tunnel for unloading ballast
Ballast compartment
Valves to control ballast release
Diving Suit 200 ft.
Submarine 300 ft.
Special Diving Suit 800 ft.
Beebe Bathysphere 2200 Ft.
Piccard Diving Balloon capable of descents to unknown depths

Interior arrangements of the diving balloon are strikingly shown in this drawing. Comparative depths to which different types of submarine machines can descend are given in the panel at the right. Note the mechanism for releasing ballast.

Diving Balloon Same in Principle as Bag Which Rises Thru Atmosphere



Bag of Piccard's record-breaking stratosphere balloon, previous to flight which carried him higher than any other man.

submarine descent was prompted by his interest in cosmic rays, which may be better studied at high altitudes than beneath the sea.

In its physical elements the submarine balloon would be the same as the stratosphere apparatus. A big aluminum ball would be the bag, but instead of inflating this with helium, hydrogen, or other gas as used in aeronautics, Prof. Piccard's plans call for plain olive oil made in the south of France.

As olive oil, or any oil for that matter, is lighter than water, the bag would easily rise to the surface when regulated by Prof. Piccard and his associate within the gondola. Lead bars and cannon balls, as well as powdered metals, will be carried as ballast. Prof. Piccard still has in his Zurich laboratory a pile of old cannon balls which he originally planned to take on his dive to ocean depths.

The bag of the diving balloon—or, more properly, the ball—will have two strong rubberized canvas belts to which the suspended cabin will be hooked by cables. The cabin will hang 50 feet beneath the ball. Two manholes for entrance and exit are provided, and eight peepholes for observation, just as in the stratosphere gondola. Lately Prof. Piccard has thought of modifying the peephole arrangement to have but one opening of grilled glass; the advantage of such an installation would be the elimination of many possible sources of leaks which might develop under the tremendous water pressure.

Ballast Control Mechanism

But the crux of the whole amazing adventure lies in the methods by which Prof. Piccard would control the rise and descent of his unique submarine craft. William Beebe's Bathysphere, previously described in this magazine, has some points in common with Piccard's balloon, in that the underwater explorers are encased within a sphere of steel.

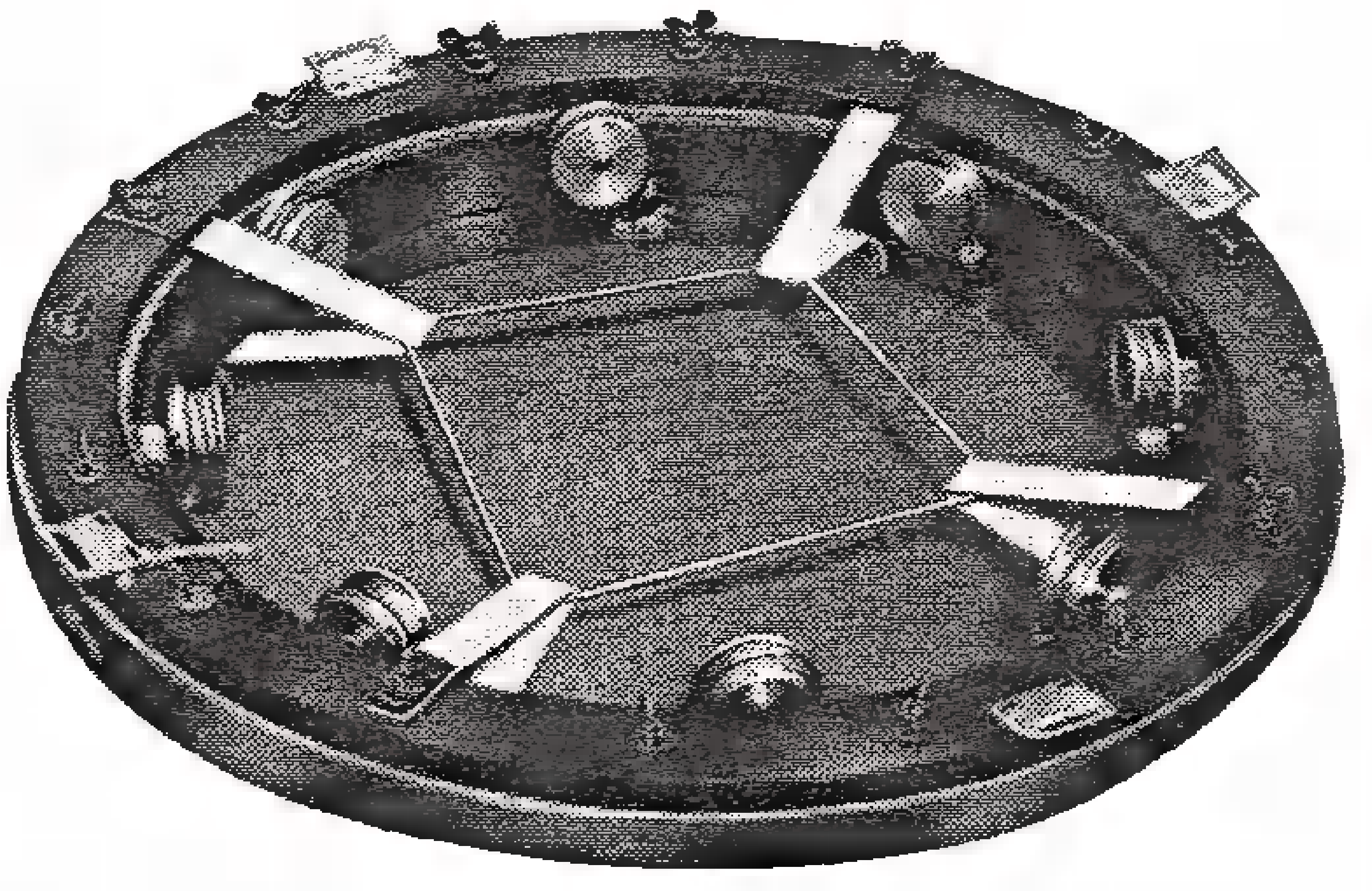
Here the resemblance ends. The Bathysphere is lowered from a ship's derrick, and its movements are entirely beyond the control of its occupants, except by means of telephoned directions. Piccard, on the other hand, will be able to control the vertical movements of his gondola at will, his diving balloon being entirely a self-contained unit.

The floor of Piccard's diving gondola will be made to contain a series of valve-controlled chutes, as illustrated in one of the accompanying drawings. These will be shaped somewhat like a funnel, fitted with shut-off valves at specific intervals, controlled by hydraulic pressure so that ballast may be released without water rushing in.

Lifting Power of Oil

As the weight in the cabin lessens, the oil in the aluminum ball lifts the craft to the surface. Careful calculations are, of course, necessary to determine the exact quantity of oil which would give buoyancy enough to return the balloon to the surface, but this is elementary mathematics to Prof. Piccard.

Safeguards will also have to be taken against suffocation, but the solution here will follow along the lines which worked



Valve for releasing gas on stratosphere balloon. In this sea diving balloon, Prof. Piccard has an entirely different problem to solve, since ballast must be carried in gondola and forced out against enormous pressure of the ocean.

Matter of Ballast and Valves for Releasing Vital to the Diving Balloon

out so successfully in the Bathysphere. Oxygen tanks, fitted with delicate valves permitting the escape of a measured quantity of gas per minute, will be installed. Also there will be two chemical units, one containing calcium chloride for absorbing moisture, the other soda lime to remove the excess carbon dioxide from the air.

Although cosmic radiation at great heights is Prof. Piccard's prime interest today, he will continue the same cosmic ray investigations when he is ready to make the ocean dive. Science would like to know if there *are* cosmic rays in the extreme depths of the sea. Always the scientist, and an adventurer only because of the fearlessness of his imagination, Piccard's prime object in the ocean dive is not sensational publicity, but the gathering of scientific data.

Pacific Ocean to be Site

Besides the cosmic ray studies, he will make a study of pressures existing at various depths. All of these investigations are complicated by the fact that instruments suited to the peculiar conditions of his gondola workshop do not exist; he will have to invent them.

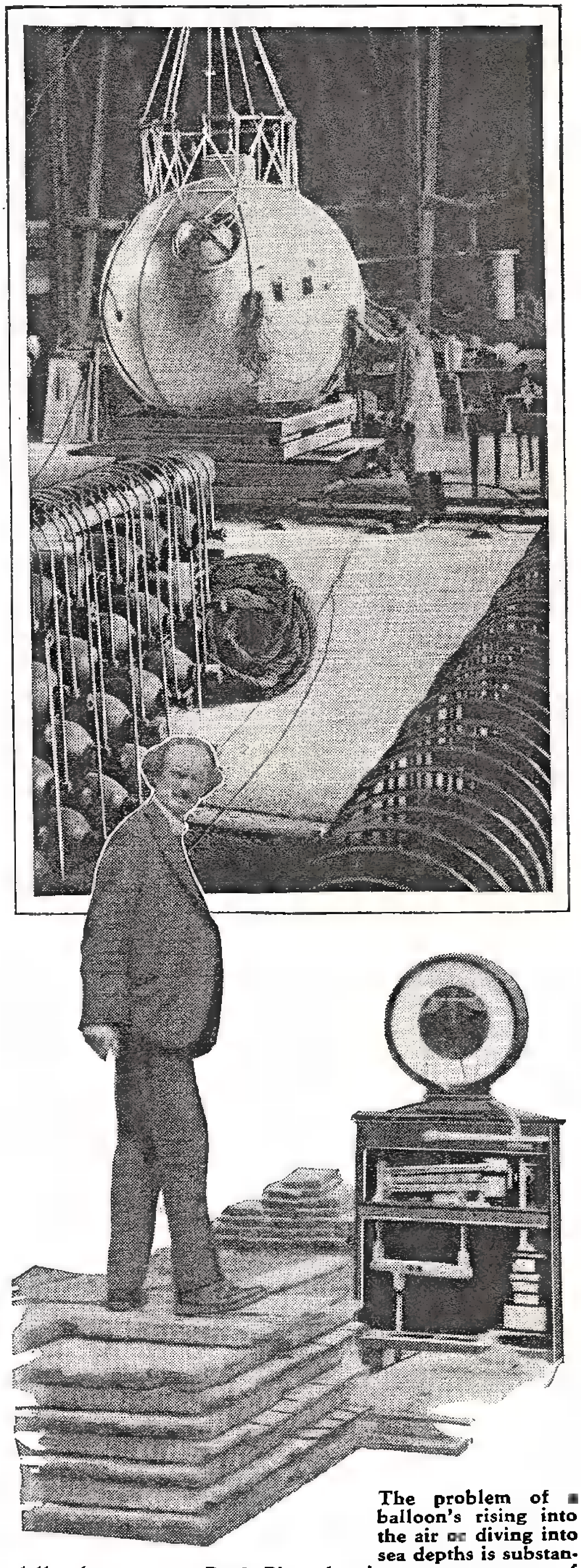
The Pacific Ocean will likely be chosen as the site of the descent. Because of the immense amount of careful work that must be done before the dive can be attempted, no definite time has been set for it. But Prof. Piccard has confided to his intimates that he might suddenly cease all his stratosphere operations to work on his diving balloon. The ocean's floor seems to be the sole remaining world left for him to conquer.

Currently, Prof. Piccard is working on plans for a stratosphere ascent in the vicinity of the North Pole, his object being to collect data which will show what differences, if any, exist in the amount of cosmic radiation in this area as compared with the more temperate climes in which his previous ascents have been made.

Balloon exploration of the stratosphere is no longer solely Prof. Piccard's province, however. Late reports are that scientists of Soviet Russia are secretly building two balloons of 35,000 and 39,000 cubic feet capacity in an attempt to double the 10-mile height attained by Piccard. When one realizes that the capacity of Piccard's famous balloon is but 4,000 cubic feet, the ambitious proportions of the Russian experiment are apparent.

A newly discovered fabric is being used in the Soviet gas bags. Hermetically sealed gondolas of the familiar spherical type will be used, but a new metal alloy is employed which, it is claimed, reduces resistance to the passage of cosmic rays and permits a more accurate measurement of them.

A further demonstration of Piccard's fertile inventiveness is found in the news that he has created a rocket which he believes can be made practical for trans-Atlantic mail and passenger service.



The problem of a balloon's rising into the air or diving into sea depths is substantially the same, as Prof. Piccard points out—a matter of delicately adjusting ballast and lifting elements (gas in the case of air flights, oil in ocean dives) to the medium in which the journey is made. Extreme care necessary in adjusting ballast is shown in photo in which Piccard is weighing himself in with stratosphere balloon ballast. Top picture shows balloon gondola, same type as would be used for submarine work. The gondola is some 6 feet in diameter as compared with 4½ feet in case of Beebe Bathysphere.

"Frost Tower" Protects Citrus Crops With Electric Fog

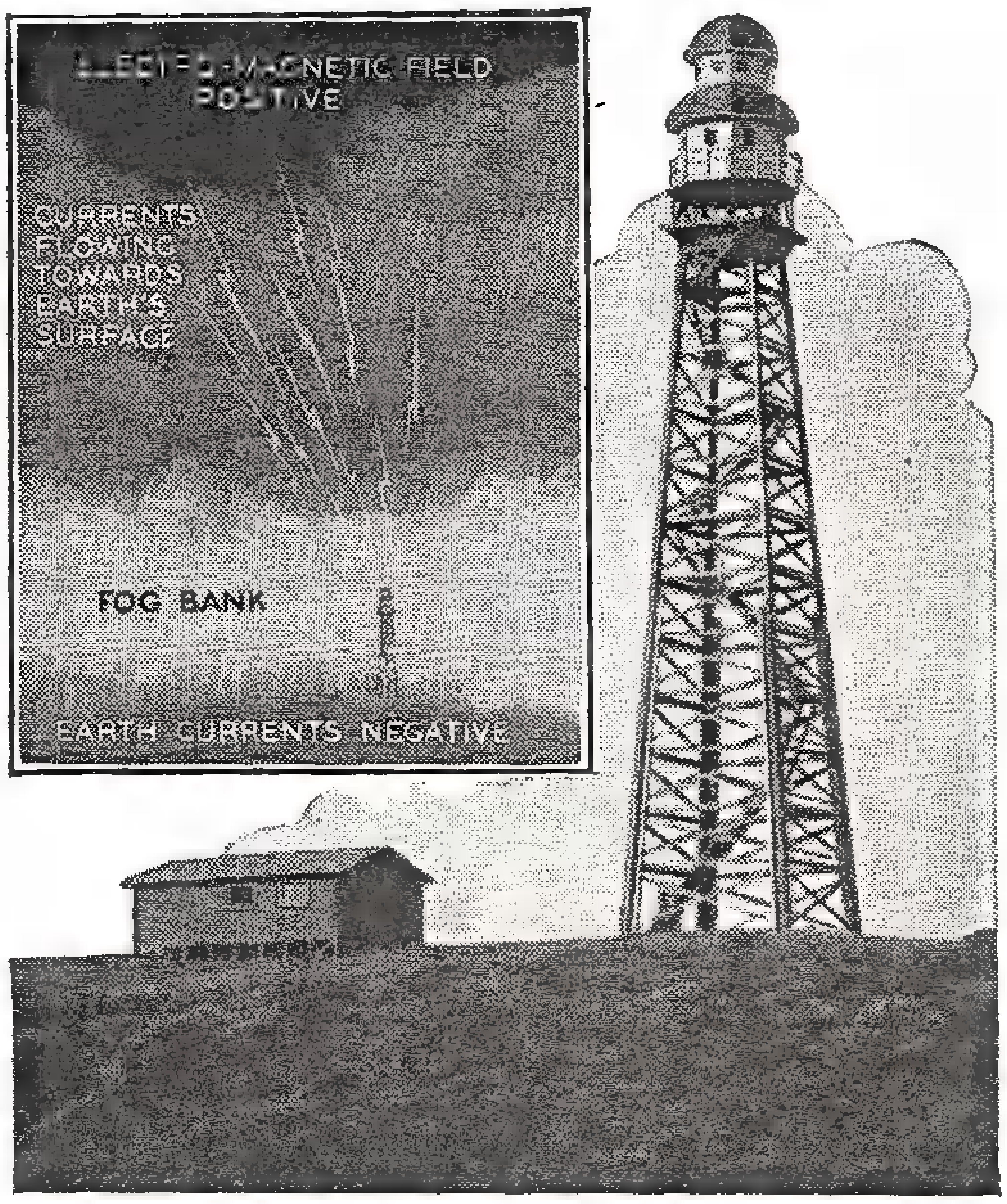

ELECTRO-MAGNETIC FIELD POSITIVE
CURRENTS FLOWING TOWARDS EARTH'S SURFACE
FOG BANK
EARTH CURRENTS NEGATIVE

Photo above shows the frost tower built on California mountains to increase flow of negative electricity of earth and create fog banks to protect citrus orchards from frost.

DEMONSTRATION of a new method of frost prevention for citrus areas took place recently when William Haight, Los Angeles inventor, put into operation his "Electrodome", located at the summit of a mountain north of Whittier, Cal., in the heart of the fruit-growing country.

The principle of the invention is based on the theory that various forms of condensation, such as fog, clouds and rain, are caused by dips or depressions in the natural electrical fields far above the earth, permitting a greater flow of energy between these positive potentials and the earth's negative potential.

The function of the "electrodome," shown at left, is to induce such condensation of moisture by the release of negative electrical currents to excite a greater flow of natural energy to the earth's surface from the moisture-laden upper air strata. This, the inventor claims, would create a wide-spread cloud blanket near the earth to prevent the occurrence of frost and thus save the crops.

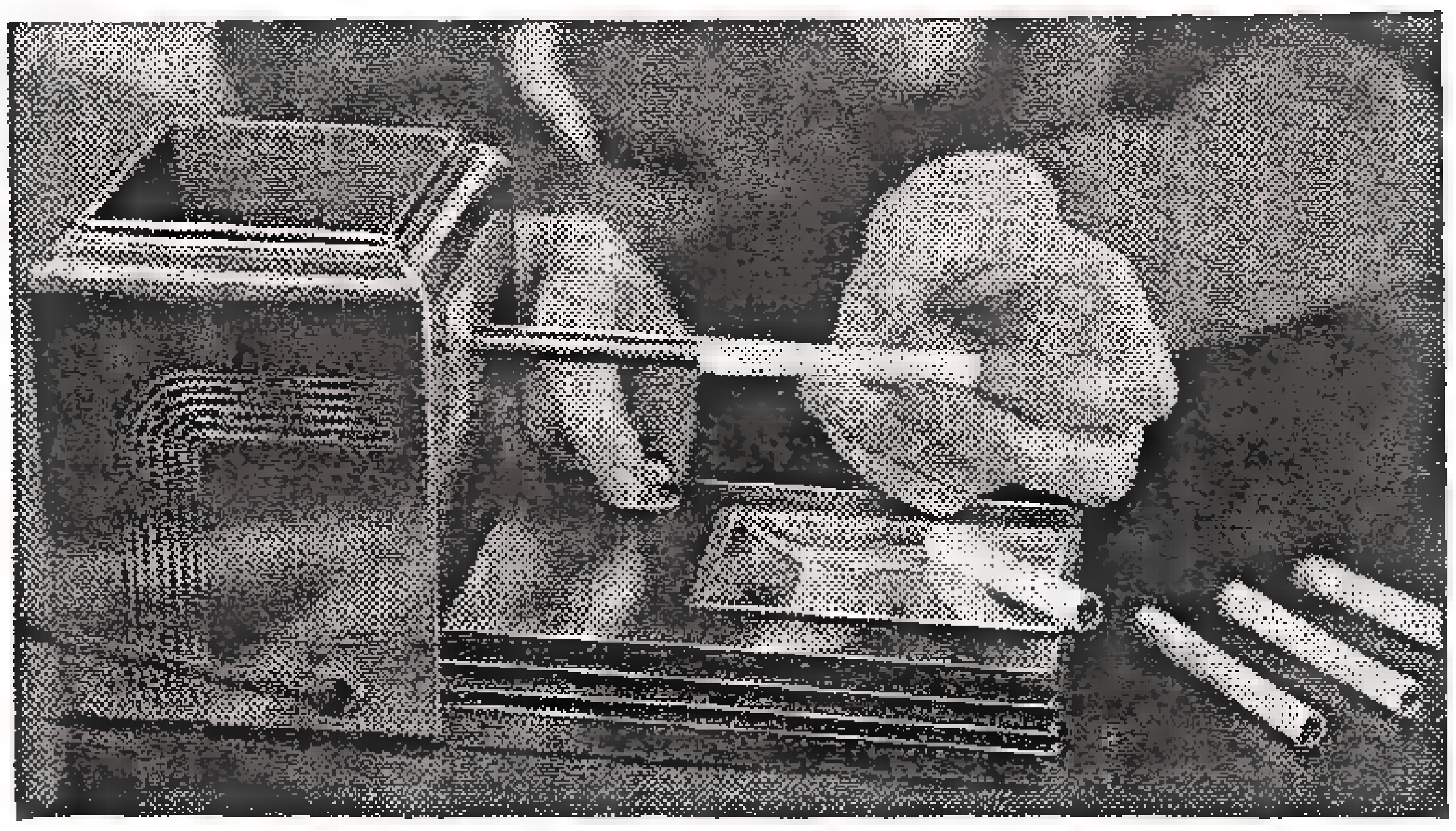
To protect the citrus crops the inventor plans to erect a network of frost towers, which in the event of weather dangerous to the fruit would be put into operation immediately.

Venus Stratosphere Like Earth's

THE existence of a stratosphere on Venus, like the upper levels of the earth's air, is a recent discovery of astronomers. They are convinced that what we actually see on Venus is never the solid surface of the planet but is only the top side of a cloud layer in the atmosphere, much as the earth would look were its weather always cloudy. Measurements of temperature of visible surface of Venus show 10 degrees below zero.

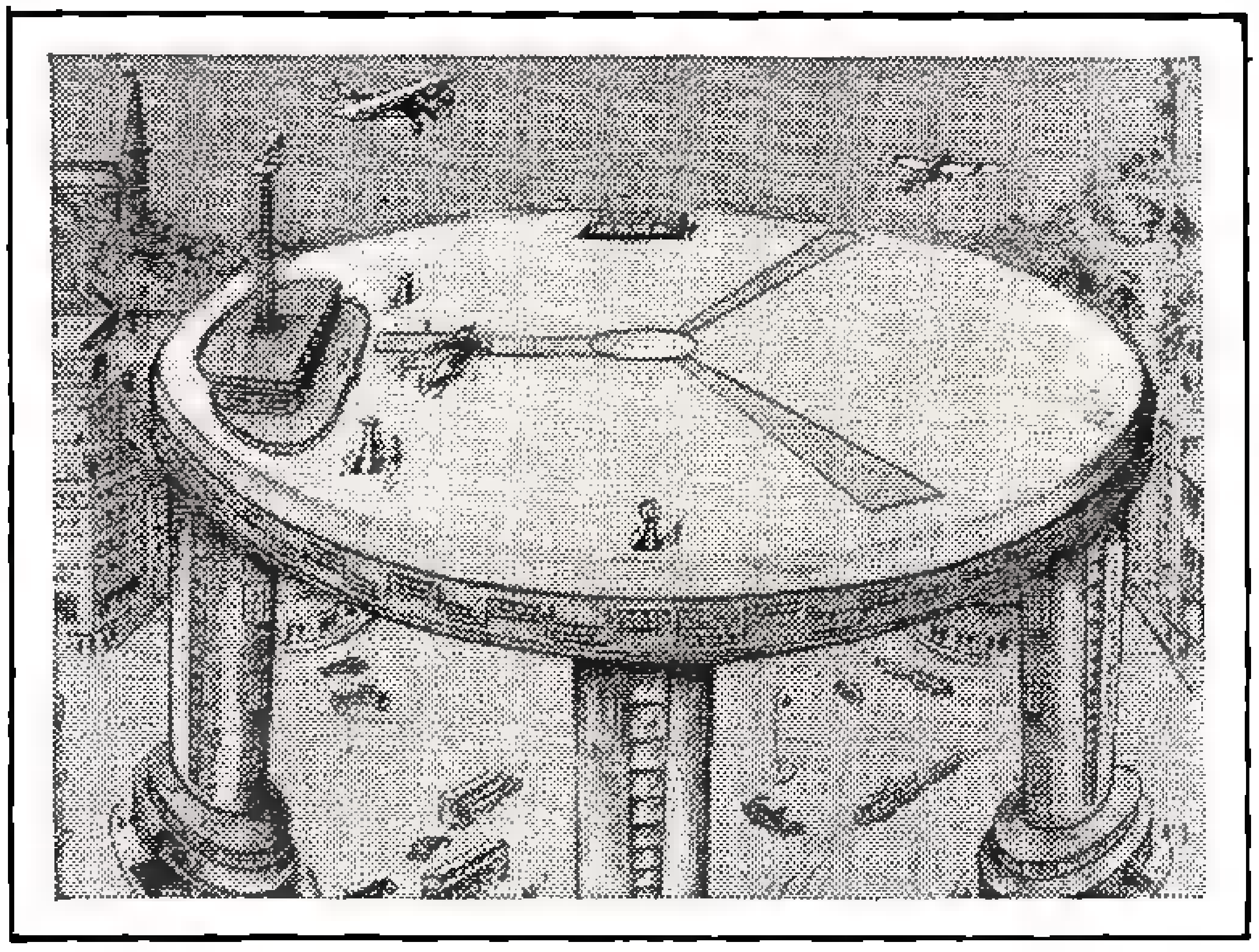
Make Your Cigarettes at Home

TWENTY perfectly round and correctly filled cigarettes can be turned out in 3 minutes with a new electric roller now on the market. Fresh tobacco is placed in the hopper and a paper tube is placed over the filler cylinder. A turn of the switch then stuffs the paper with tobacco.



Metal tube of cigarette maker fills paper with tobacco.

Elevated Airport in Heart of City

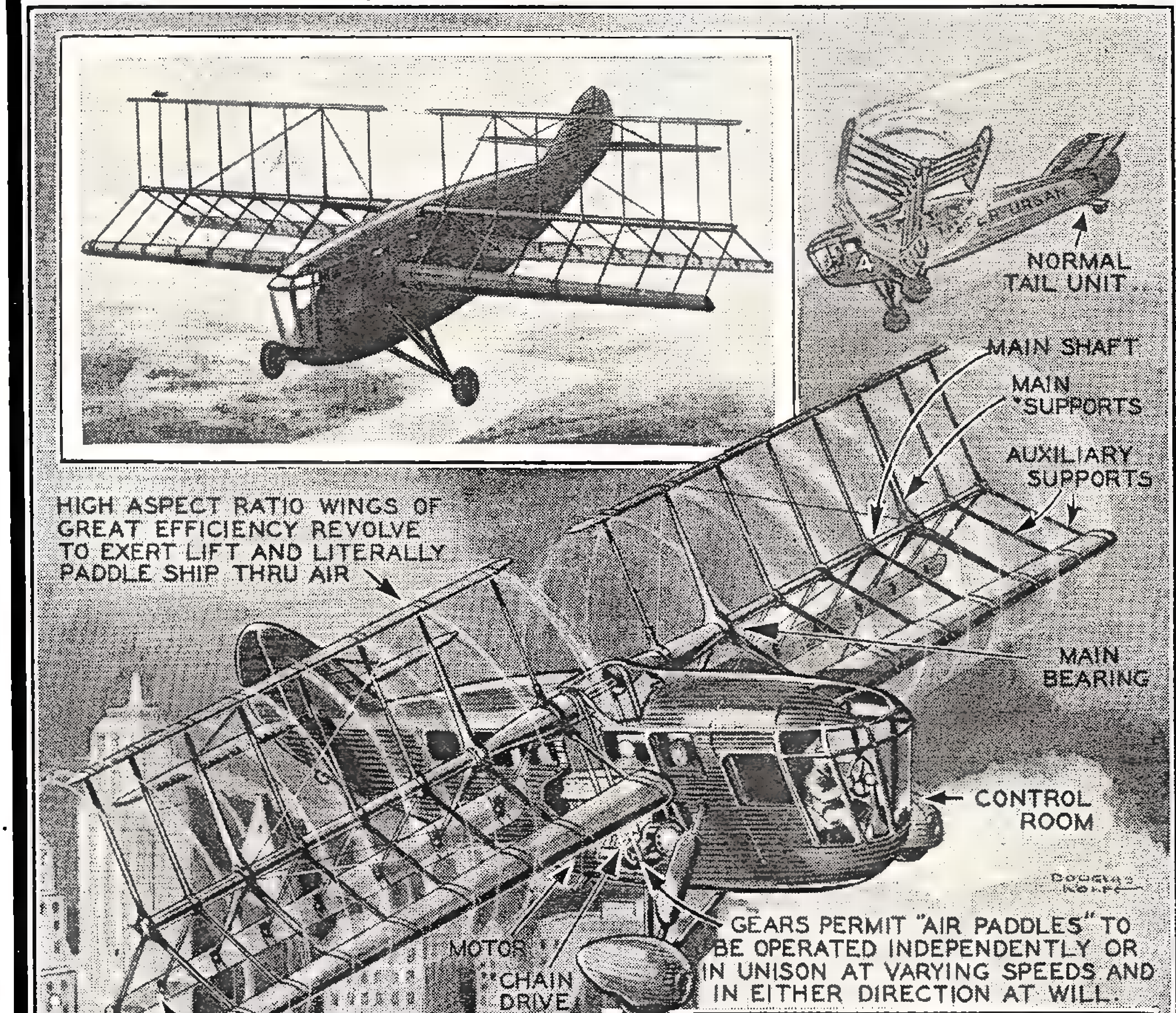


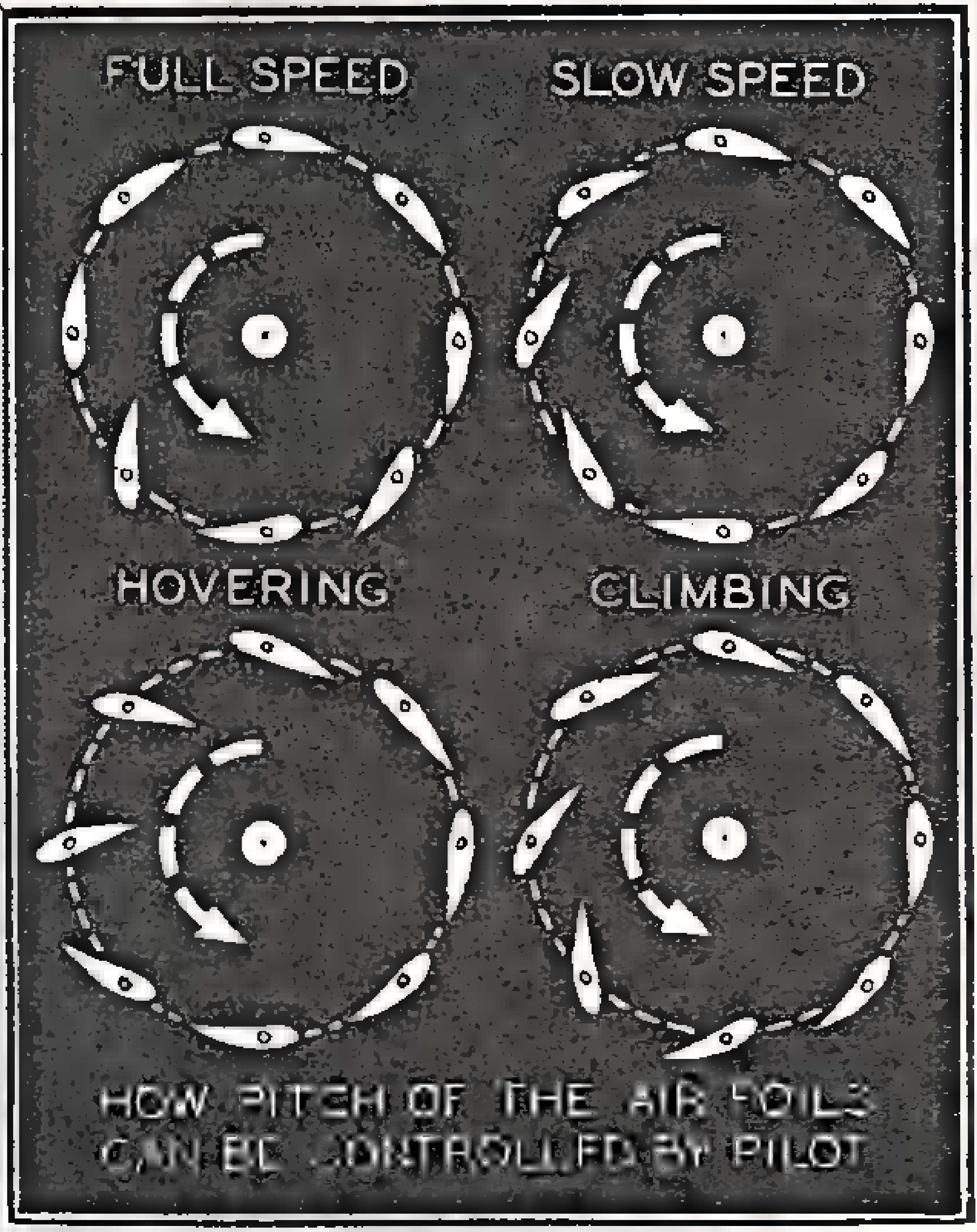
Artist's drawing shows elevated air field proposed by engineers for erection in heart of city. Passengers are carried to field on elevators running up through the giant pillars.

THE current tendency to locate airfields on the outskirts of a city proves exceedingly inconvenient to sky travelers, so a German engineer has drawn up plans for an elevated airport that can be built in the heart of the city and provide the best accommodations.

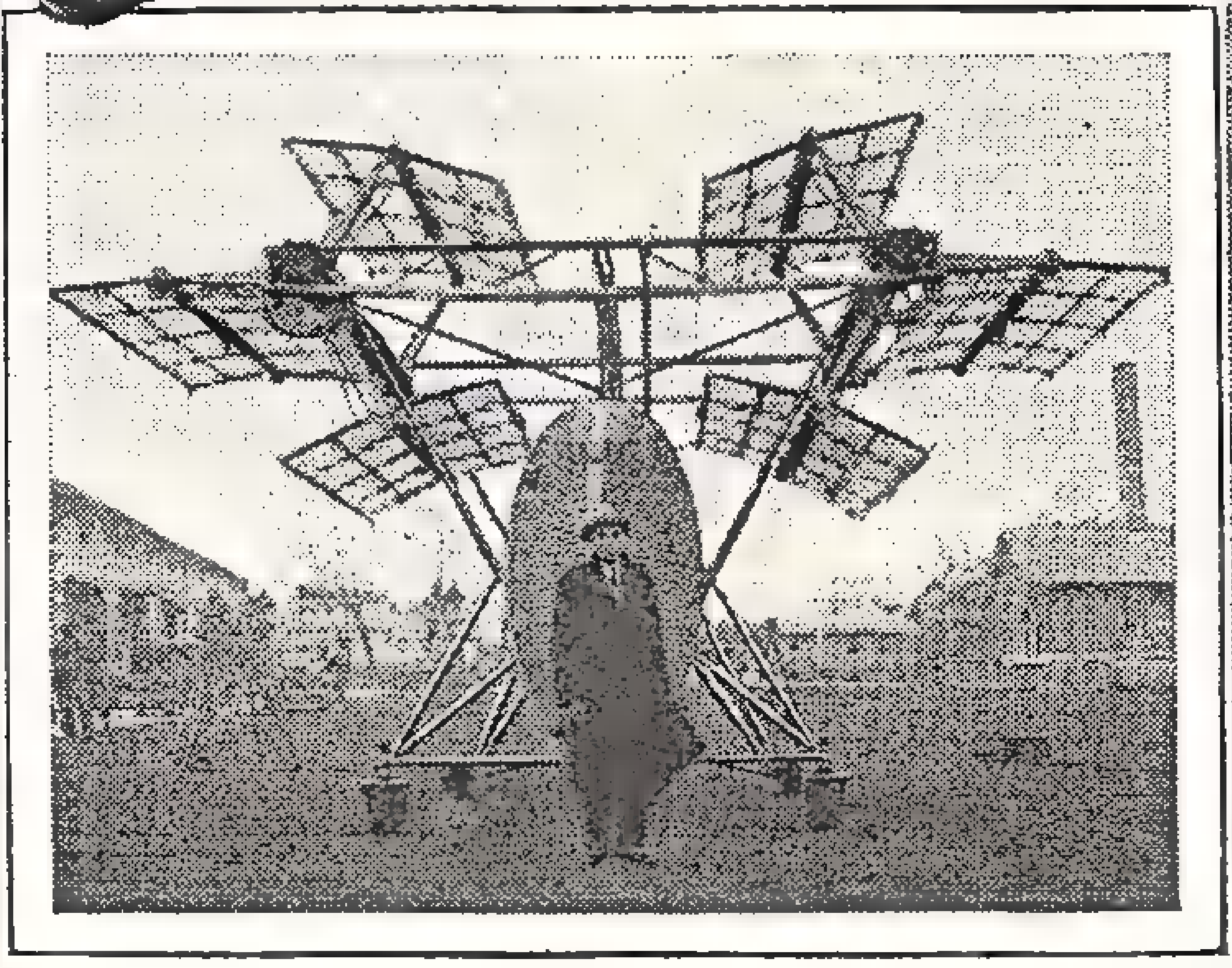
The proposed airfield, shown in the artist's drawing above, would be supported by four enormous pillars above the city streets, whose interiors would be occupied with passenger elevators. At the bases would be restaurants and small hotels, according to plans outlined.

Paddlewheel PLANE Latest in Aviation


NORMAL TAIL UNIT
MAIN SHAFT
MAIN SUPPORTS
AUXILIARY SUPPORTS
HIGH ASPECT RATIO WINGS OF GREAT EFFICIENCY REVOLVE TO EXERT LIFT AND LITERALLY PADDLE SHIP THRU AIR
MAIN BEARING
CONTROL ROOM
GEARS PERMIT "AIR PADDLES" TO BE OPERATED INDEPENDENTLY OR IN UNISON AT VARYING SPEEDS AND IN EITHER DIRECTION AT WILL.
MOTOR
CHAIN DRIVE
PIVOTS

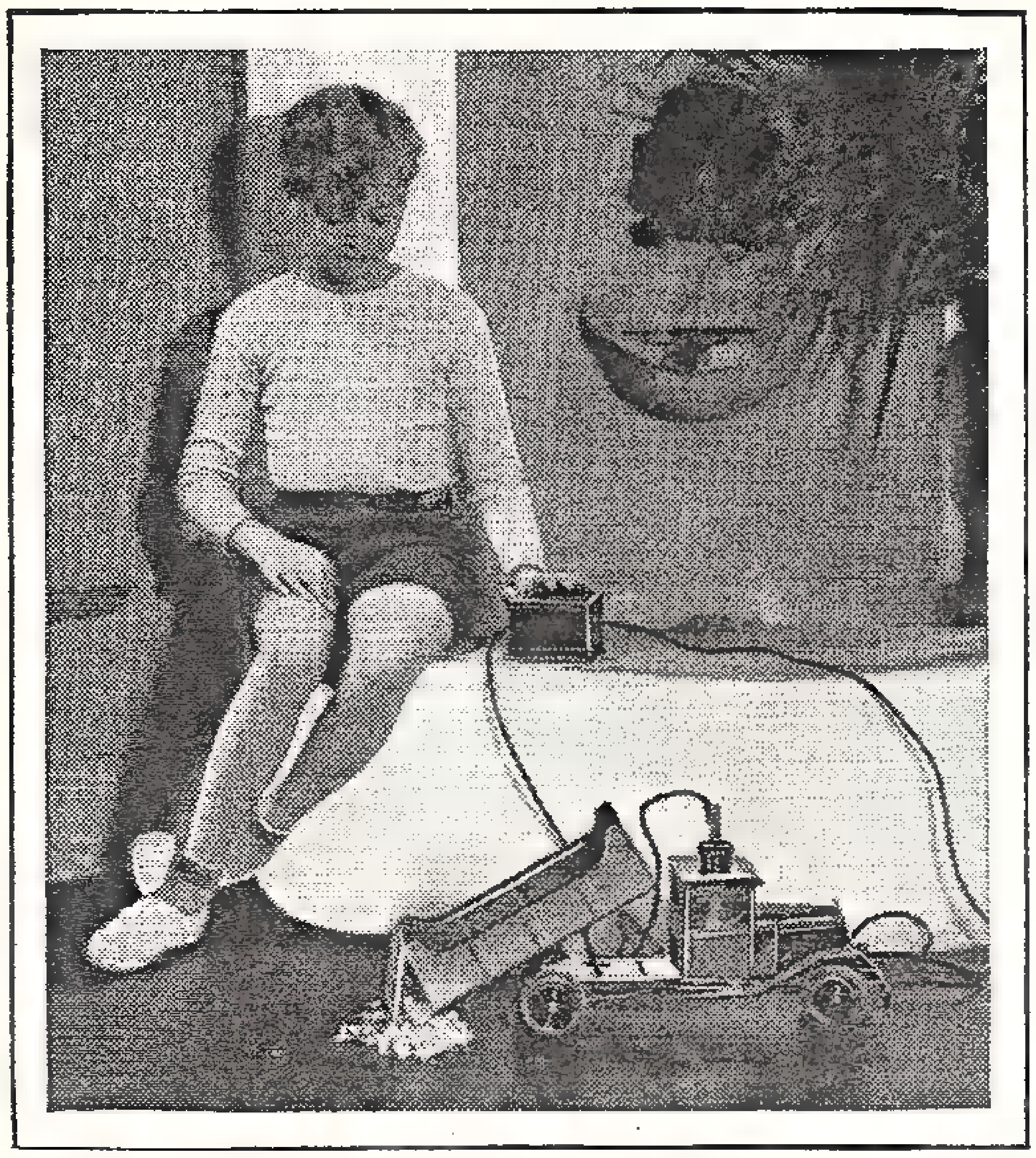

FULL SPEED
SLOW SPEED
HOVERING
CLIMBING

HOW PITCH OF THE AIR FOILS CAN BE CONTROLLED BY PILOT



Predictions that the rotating wing type of plane would win to an outstanding place in the aeronautical world are coming true. From Rohrbach laboratories in Germany comes news of the development of a plane with paddle wheel wings as illustrated above. Driven by a 120 h.p. engine the wheels extend from the side of the fuselage and have a feathering action which permits the plane to descend or ascend vertically, to hover in mid-air, to turn in its own space, and even to fly backwards. The angle of the blades is controlled from the cockpit. Development of a similar type of plane has been undertaken in this country by H. H. Platt, shown above.

Remote Control Toy Truck Dumps Cargo Like Real Auto



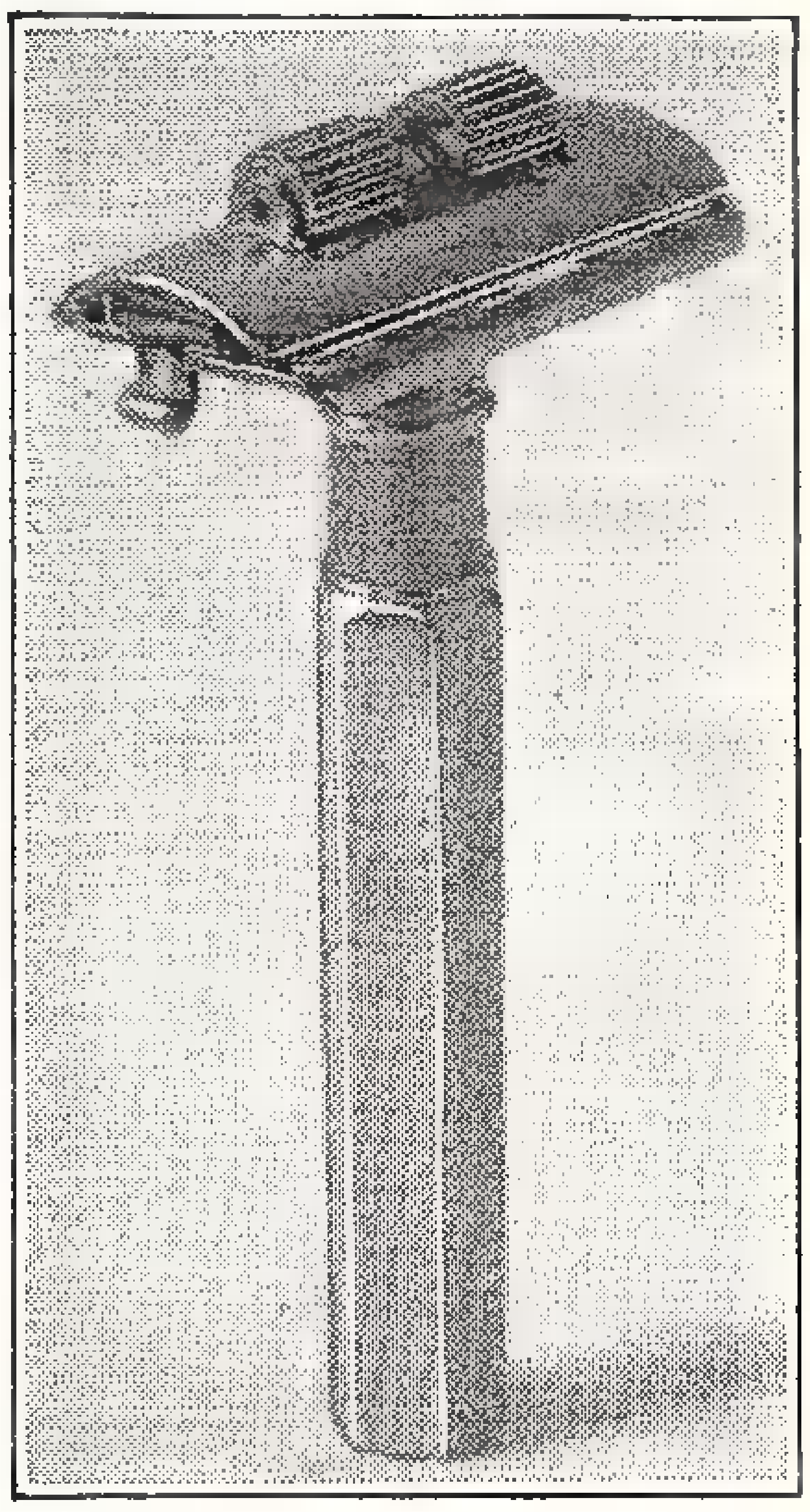
Operated from control box, electric toy truck will perform all maneuvers of its big brothers. Above it's seen dumping.

YOUNGSTERS with highly developed automotive instincts will get some keen fun out of operating a new remote control toy auto, now on the market, which will do anything its big brother will do. All maneuvers are controlled from a distance, in any sequence, merely by pressing a button on a switch box. The toy takes its power from any close-by socket. One operation it performs is shown in the accompanying photo.

Science Says Don't Spare the Rod

THE most scientific way to punish a child is by old-fashioned spanking, is the belief of an eminent English educator. Pain in the skin he regards as Nature's method of training all young animals. Merely mental punishments such as scoldings or arguments are unnatural and relatively ineffective. Even famous psychologists spank their kids and thus do not practice what they preach.

Razor Has Oscillating Blade



Rollers placed against the skin impart lateral motion to blades.

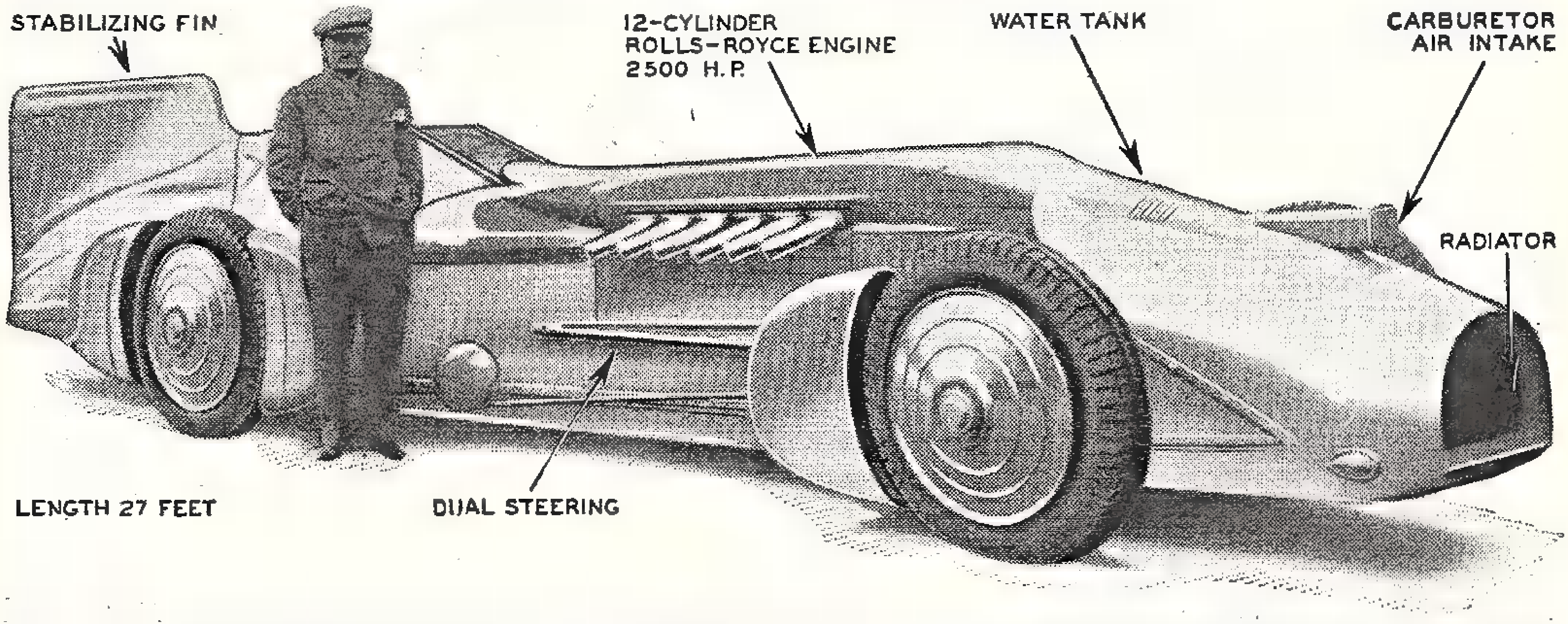
A SAFETY razor with an oscillating blade has been introduced for the shaving comfort of tender faces. The lateral motion of the blade is imparted by a roller on the razor head which contacts the surface of the skin, insuring the proper shaving angle and at the same time transmitting the sliding motion to the blade. This shearing action cuts the beard off squarely, eliminating ingrowing hair.

Campbell Seeks New Speed Record in Rebuilt "Bluebird" With 2500 h.p.

CAPTAIN Malcolm Campbell, not content with the world's land speed record of 253.9 m.p.h., will streak out along the sands of Daytona Beach, Florida, to reach a new high in the world of speed.

His record breaking "Bluebird" shown below has been rebuilt from stem to stern. Length 27 feet, weight 4½ tons; she is powered by a new engine, a Rolls-Royce 12-cylinder super-charged Schneider Trophy aero motor of nearly 2500 brake horsepower—1000 more horsepower than before.

Outstanding features of the bus are pointed out below.



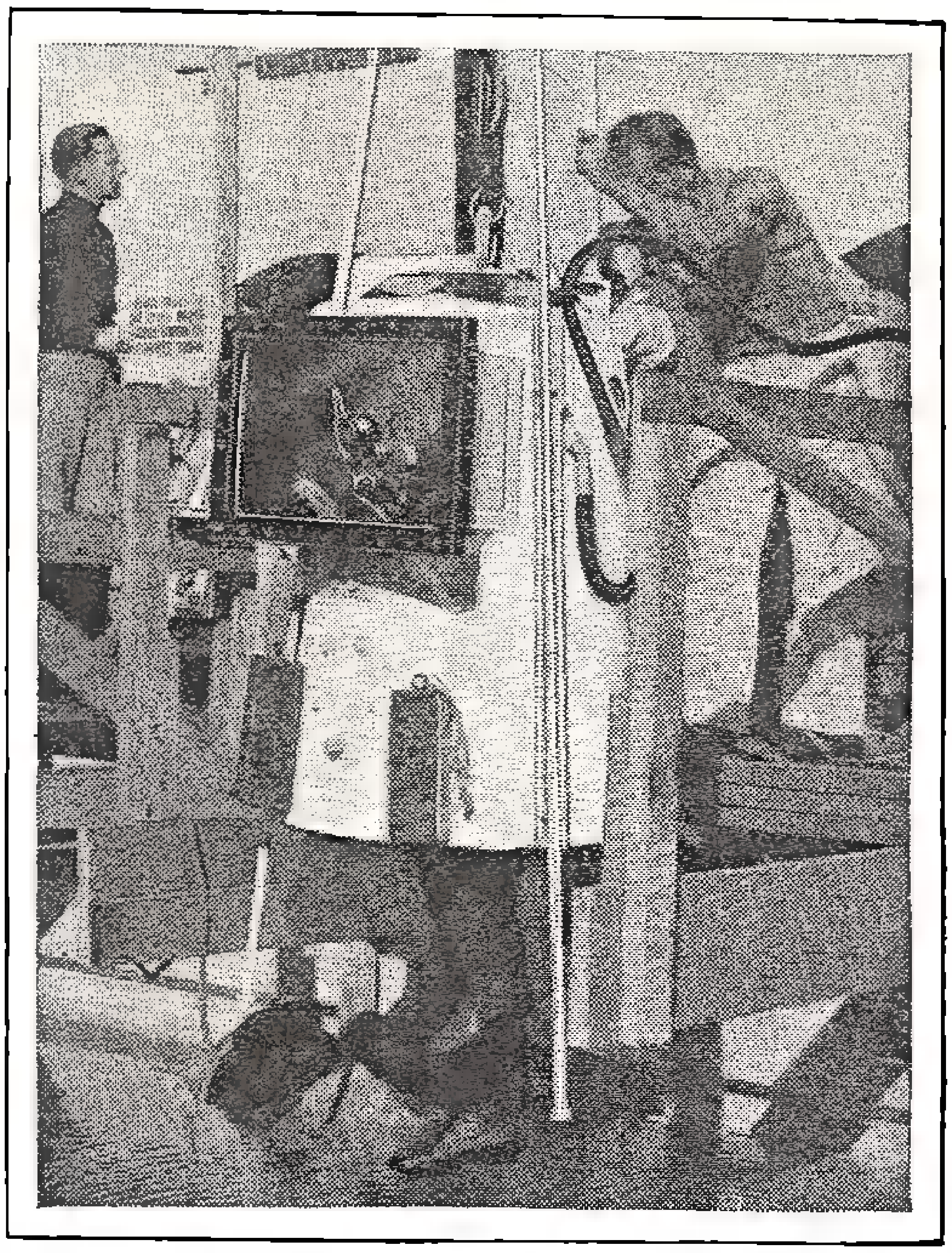
Capt. Malcolm Campbell beside his reconditioned "Bluebird" now powered by 2500 h.p. Rolls-Royce 12-cylinder engine.

Movie Cameramen Film Octopus Actor From Diving Bell

AGATHA refused to appear before the movie camera, so the camera is appearing before her in her native haunts.

Now Agatha happens to be a huge octopus, measuring 14 feet from tentacle tip to tentacle tip. When given a screen test in a Hollywood swimming pool, Agatha got temperamental and asserted that she would only act in an "at home" location.

So the camera crew has gone to Agatha, taking along an intrepid cameraman, a diving bell, and a rescue squad of divers. The diving bell, shown at the right, is of steel one-half inch thick and capable of being sent 120 feet below the ocean surface. Air lines and a battery of extra oxygen tanks keep the cameraman alive while he performs his arduous and perilous task of filming Agatha. A window in the front permits an unobstructed view of Agatha's act. In case Agatha becomes enamoured of the cameraman, divers stand ready for rescue duty.



Hollywood cameramen in specially constructed diving bell preparing to descend to ocean floor for film performance of Agatha, a huge octopus measuring 14 feet across.

Rubber Mouthpiece Protects Boxer

To protect his teeth and gums from blows of opponent, Tony Canzoneri, lightweight champ of the world, will wear this new type rubber mouthpiece, made from a special cast to assure a perfect fit.

IN HIS coming fights Tony Canzoneri, lightweight champion of the world, will be wearing a new type of rubber mouthpiece to protect his gums and teeth against the blows of an opponent.

The mouthpiece, shown above, is made of rubber and constructed from a special cast of Tony's mouth to assure a perfect fit.

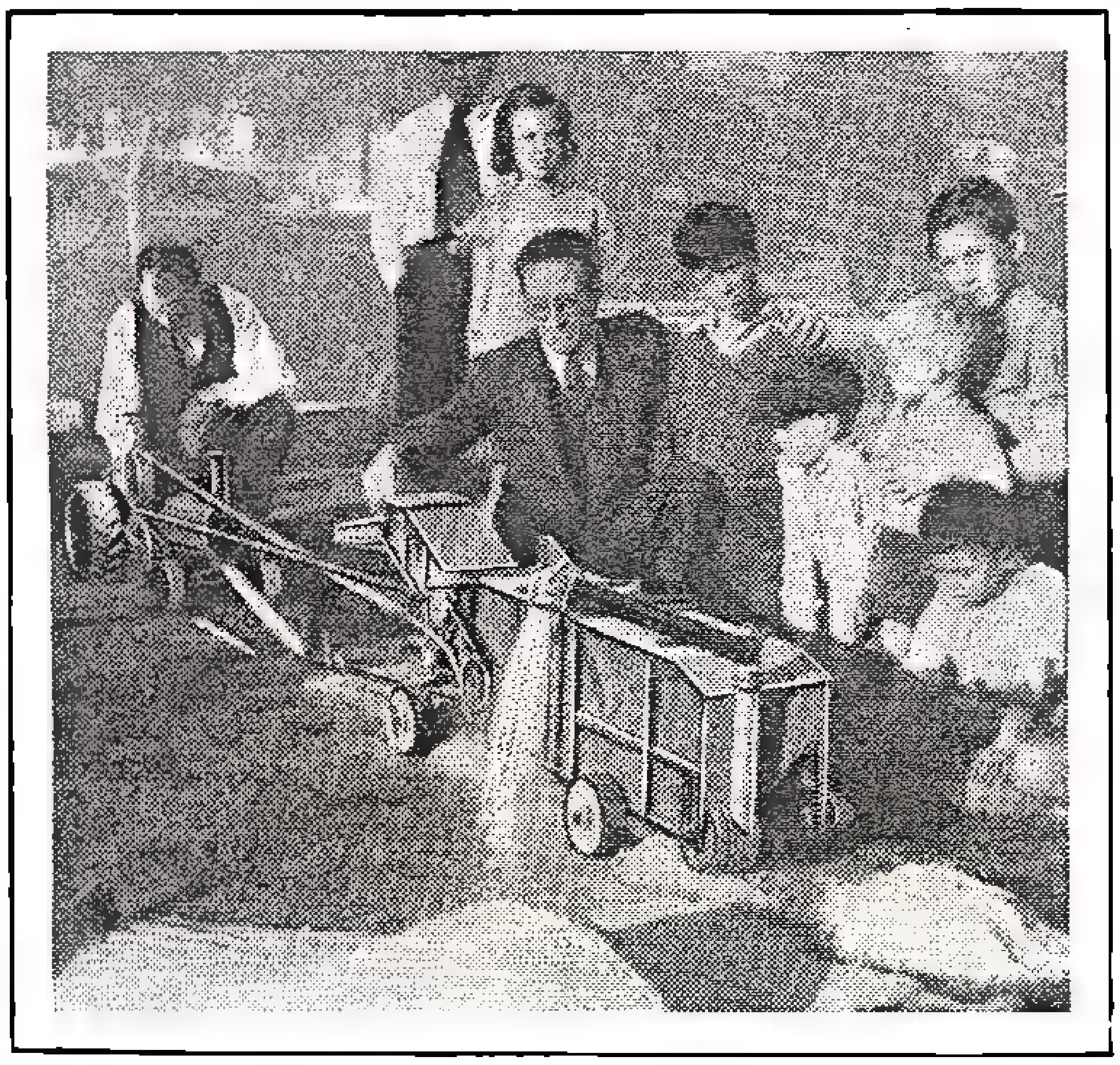
45 Tons Squeeze Germs to Death

WHETHER or not germs can be killed merely by squeezing has been tested by the French Academy of Sciences. Pressures up to about 30 tons to the square inch the germs seem to withstand reasonably well but one of about 45 tons to the square inch begins to kill them. Some kinds of germs, however, were found to be still alive after being squeezed for three quarters of an hour at a pressure of more than 130 tons to the square inch.

Midget Thresher Does Real Work

THE latest in models is a miniature threshing machine which threshes miniature crops, presumably crops of birdseed. The tractor engine burns coal like its big brother, and generates 1⅝ h.p. at 125 lbs. steam pressure.

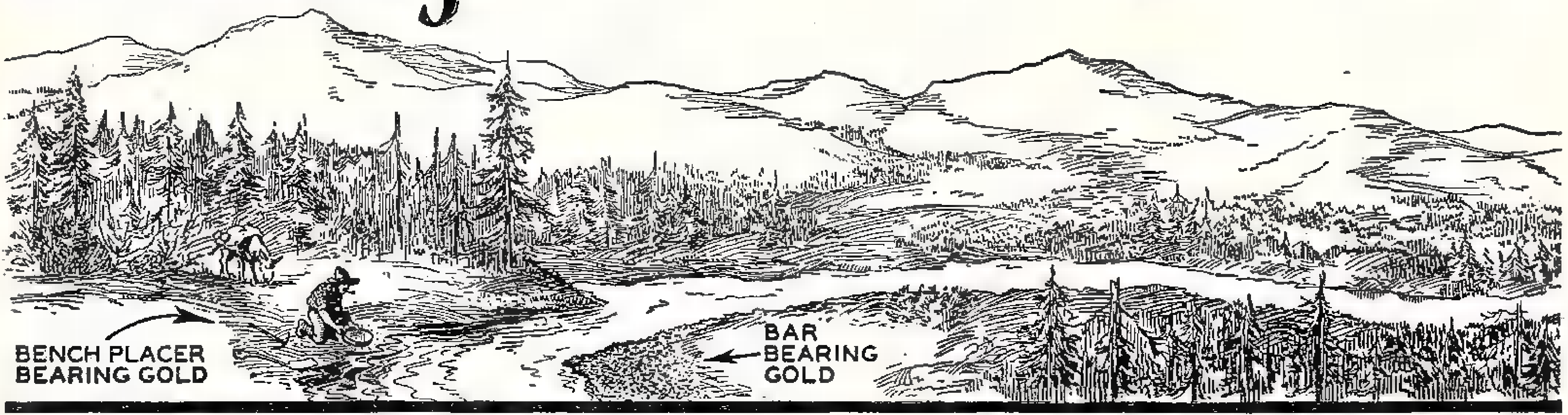
Complete in every detail, the thresher has a self feeder, wind stacker, elevators, straw racks and shakers. The engine and thresher together have 2730 moving parts.



It actually threshes, does this miniature threshing machine. The tractor engine burns coal, generates 1⅝ h.p. under 125 pounds steam pressure. There are 2730 moving parts.

Easy Lessons for the Gold Hunter

GOLD and HOW



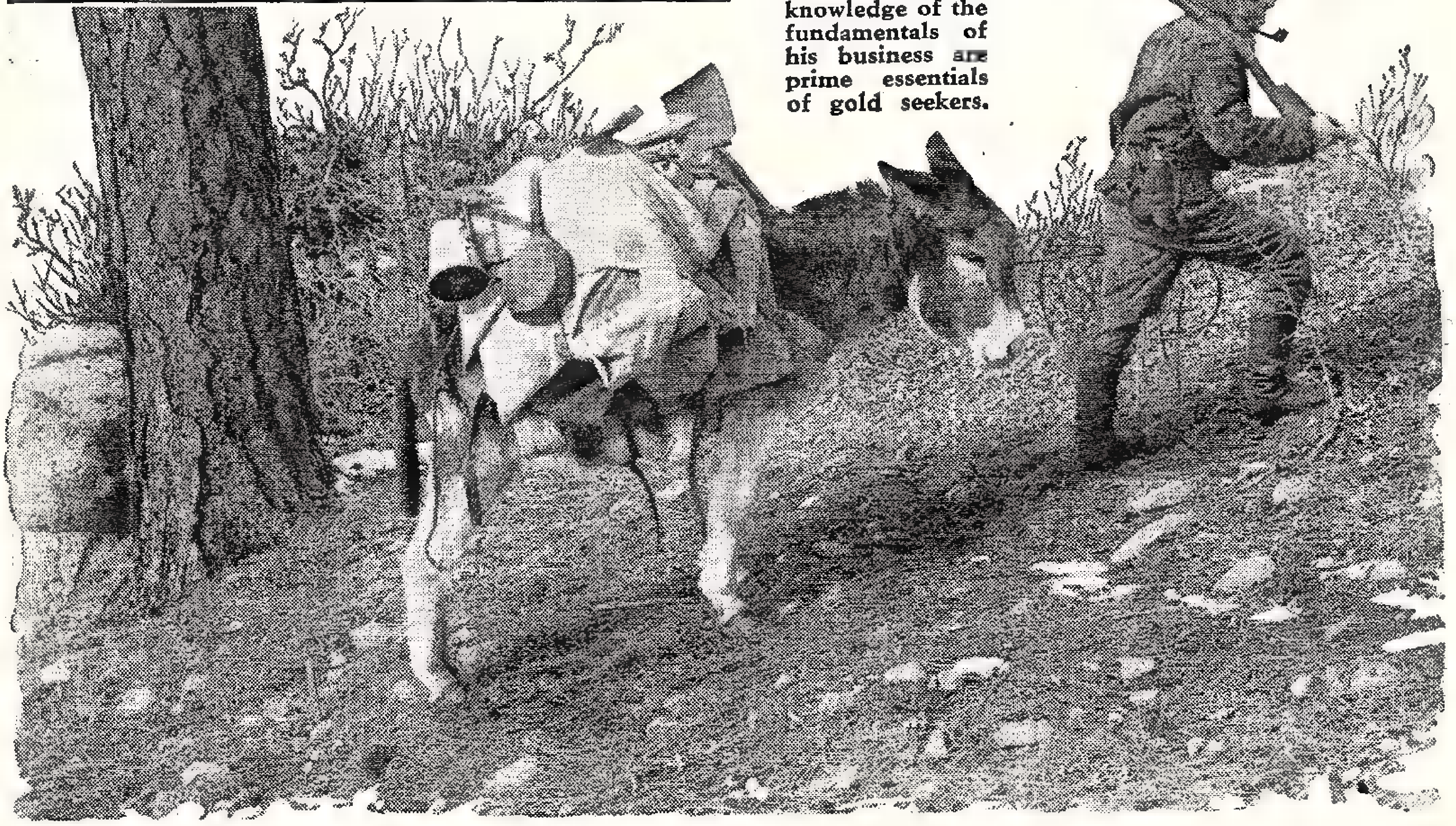
Putting gold sands through a home-built washer in a "school" for gold seekers, conducted in a Denver creek.

THE editor of MODERN MECHANIX AND INVENTIONS has asked me to write about the art of prospecting for gold and the amateur's chances of cleaning up in the new gold rush which has been growing during the past few months in our western states.

"You've carried a pack through the gold country of the Rockies," he said to me. "You know geology; you know the tricks of the trade and all about the hardships as well as the adventure and the chance of striking it rich. Give our readers a straight-from-the-shoulder account of what's what—the same sort of pointers and advice you would give if you could talk with each man face to face."

So here's the first of a series of articles on the subject of gold and how to find it which will run through several issues of the magazine.

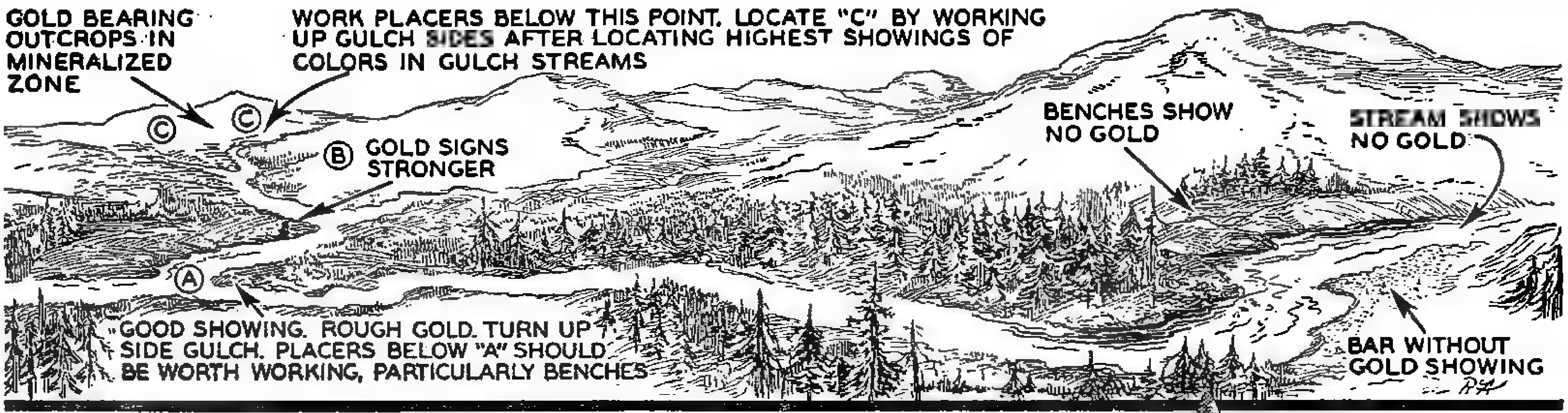
First off, there *is* a gold rush on in our



Sound health to withstand the rigors of roughing it, a minimum of equipment, and a knowledge of the fundamentals of his business are prime essentials of gold seekers.

to FIND IT

by ARTHUR HAWTHORNE CARHART


GOLD BEARING OUTCROPS IN MINERALIZED ZONE
WORK PLACERS BELOW THIS POINT. LOCATE "C" BY WORKING UP GULCH SIDES AFTER LOCATING HIGHEST SHOWINGS OF COLORS IN GULCH STREAMS
C
C
B GOLD SIGNS STRONGER
BENCHES SHOW NO GOLD
STREAM SHOWS NO GOLD
A
"GOOD SHOWING. ROUGH GOLD. TURN UP SIDE GULCH. PLACERS BELOW "A" SHOULD BE WORTH WORKING, PARTICULARLY BENCHES
BAR WITHOUT GOLD SHOWING

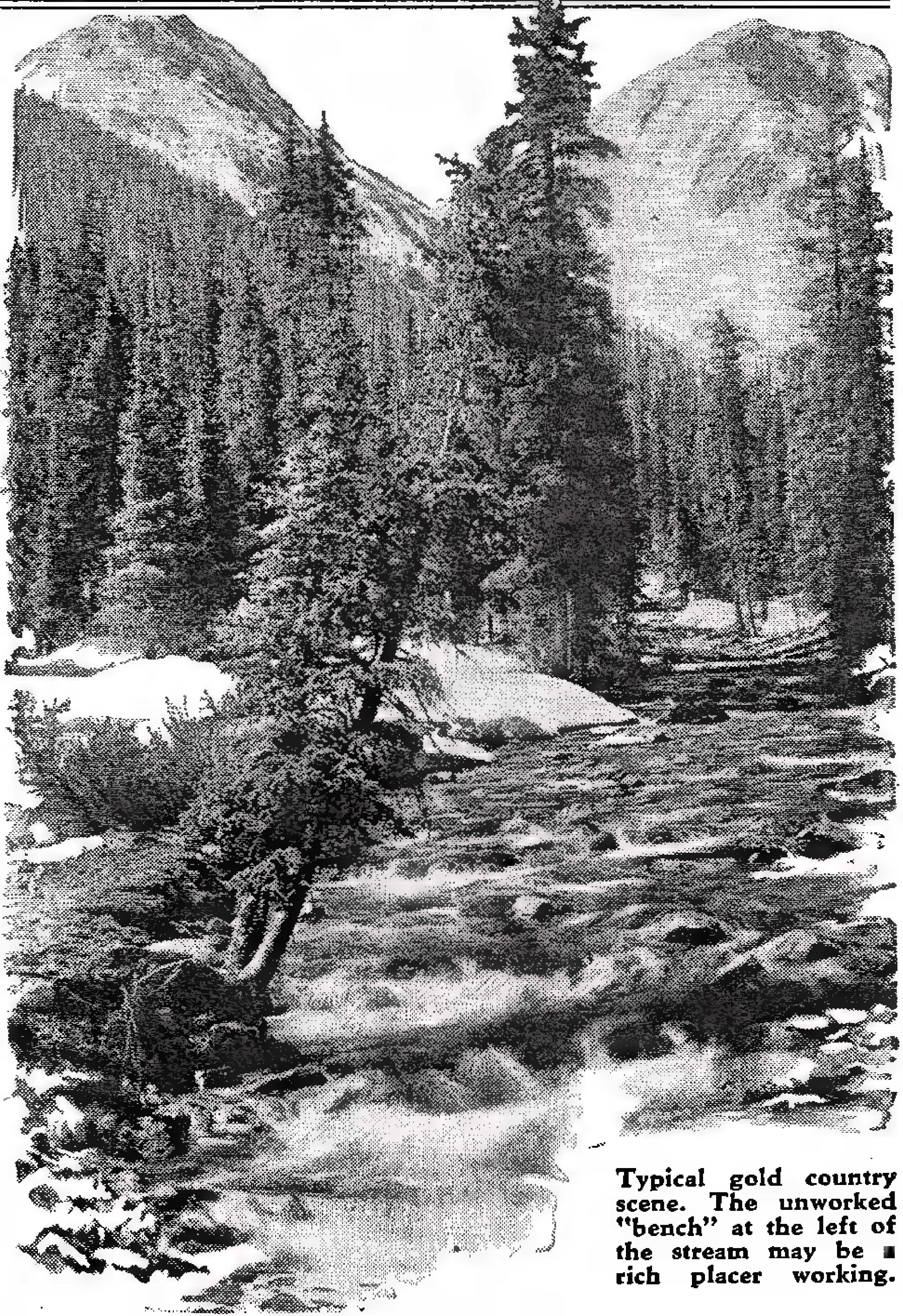
Here's method by which prospector, using his gold pan as a tool, traces the color showings in a stream bed until he finally locates rich veins from which the gold has been washed down.

western mountains. Those who have made good wages and better have been those who knew what to look for, how to look, and where to look.

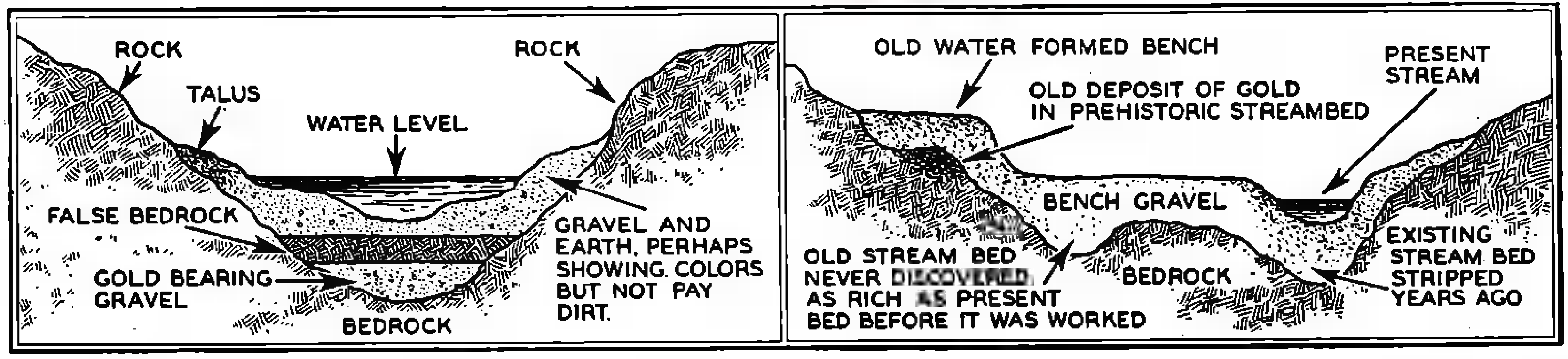
The old saying that "Gold is where you find it," is true only if the place prospected is a logical gold-bearing formation. Once on the right road and warned against blunders, the distance you may go depends largely on yourself.

Mining is hard work. Average rewards are not high. The man who becomes rich from it is the exception. But there always is the chance of "hitting it rich" and this keeps luring the miner on.

Your health must be sound so you can rough it. You must have enough capital to get simple prospecting equipment and meet the cost of grub bills for a month or two. You may hit pay dirt right away or you may have to hunt. It is better to search a few weeks to get dirt that will pay well than be forced to struggle with ground that will return barely enough to live on. If you do not have sufficient funds some friend or group of friends may "grubstake" you; the grubstaker putting up funds, the miner furnishing time, labor and his knowledge with a 50-50



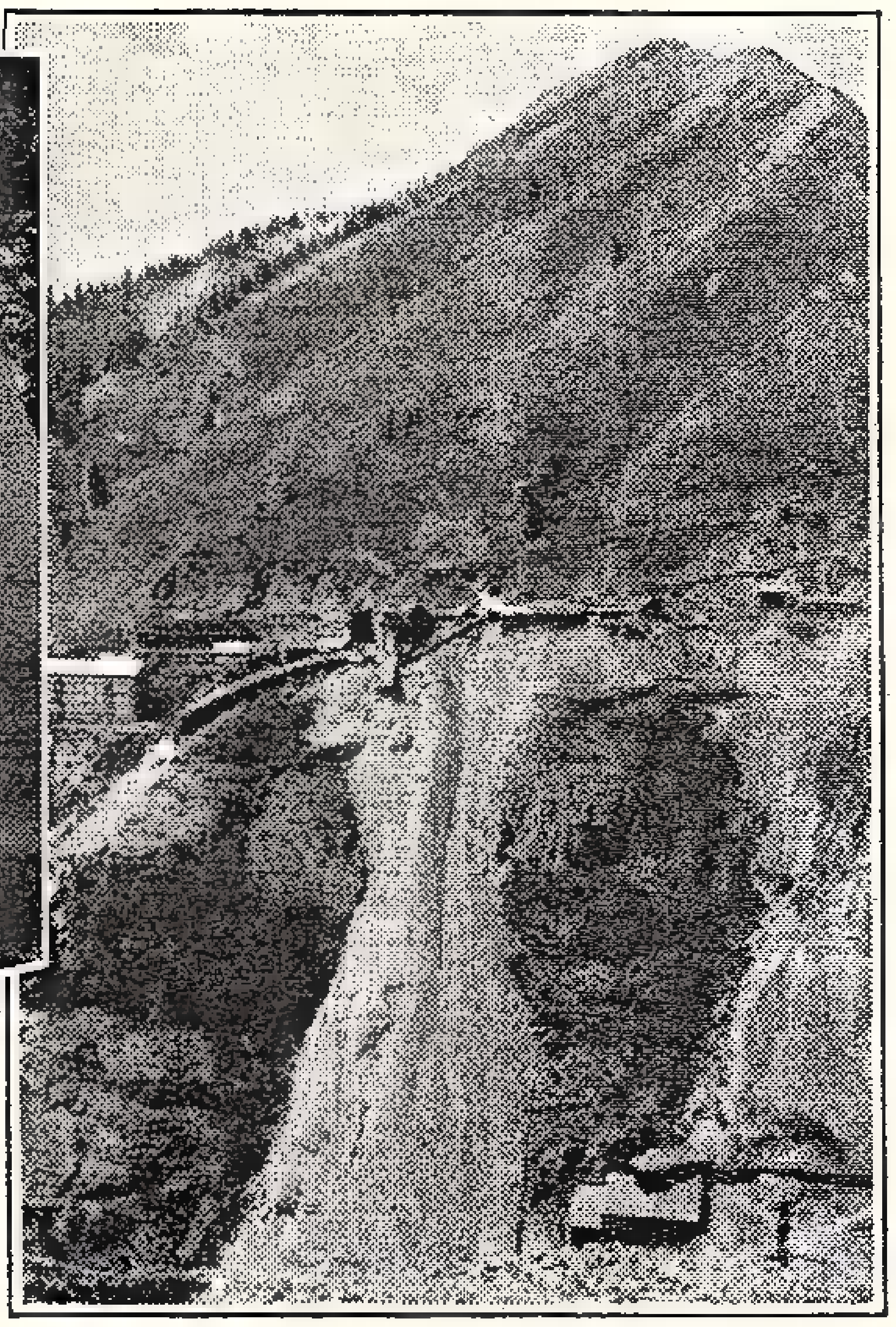
Typical gold country scene. The unworked "bench" at the left of the stream may be a rich placer working.


ROCK
TALUS
WATER LEVEL
ROCK
FALSE BEDROCK
GOLD BEARING GRAVEL
BEDROCK
GRAVEL AND EARTH, PERHAPS SHOWING COLORS BUT NOT PAY DIRT.
OLD WATER FORMED BENCH
OLD DEPOSIT OF GOLD IN PREHISTORIC STREAMBED
PRESENT STREAM
BENCH GRAVEL
OLD STREAM BED NEVER DISCOVERED AS RICH AS PRESENT BED BEFORE IT WAS WORKED
BEDROCK
EXISTING STREAM BED STRIPPED YEARS AGO

The cross-section of a canyon shown at left above is a typical formation. To get real gold, you must go all the way to genuine bedrock. Drawing at right shows how rich deposits are sometimes discovered, even though the ground has been previously worked over. In bench placers, dig plenty of holes, testing down to genuine bedrock to prove your field.

Prospector Can Camp Alongside Highway, Making Pack Trips From Base

Proper use of gold pan is explained in this article. Except in rich workings, gold pan alone does not return day wages.



The prospector can travel by auto, camping out alongside the highway if he prefers. At right above, workings of the famous Smugglers' Union Mine in Colorado Rockies.

split if profits result. Grubstakers, be sure your man knows at least the elementary job of prospecting.

The first move is to decide what district to prospect. Most western states have put out elementary handbooks dealing with small mining operations within their borders and these can usually be secured from the mining commission at the state capital. Most of these show by maps which districts have gold in them. Get such a handbook, study it, and after you have selected the district for first trial, get all additional information on that district that is available. Often there are U. S. Geological Survey reports, or state surveys, and good maps that will save many days of blind effort.

For general camp equipment an auto camping outfit will serve. By setting up a camp near a road and then hiking out with a knapsack in two or three day trips, big territory can be covered. After a good prospect is located it may be necessary to pack in with horses, but in prospecting go light and keep traveling.

The basic tools of a prospector are a gold pan, a geologist's hammer, a small iron mortar and pestle, a small bottle of mercury, a light shovel such as a trench shovel, a magnifying glass, a miner's "spoon," and the best map of the region you can get. Add several ore sacks so if your searching brings you a lode showing mineral adequate samples may be taken. Mark them, for many a prospector has had a report on a rich sample only to suddenly realize that he cannot certainly identify the location from which it originated since he had not marked it when he found it.

Learn Status of Ground

With this equipment we are ready to look for pay dirt. Supposedly you have read the U. S. and state mining laws and know exactly how to stake the claim if you find it. You have decided to prospect on the public domain so in case you find anything you can get title to it. But there are various parcels of privately owned lands even in the heart of such federal lands. Know the status of lands you are prospecting and avoid the disheartening experience of finding pay dirt only to have the legal owner show up and shove you from the find. However, there are some of the best mining opportunities on these private lands and if you find one that looks good usually a lease on a 10 per cent royalty basis may be arranged. Know the status of the ground you prospect; it may save heaps of trouble.

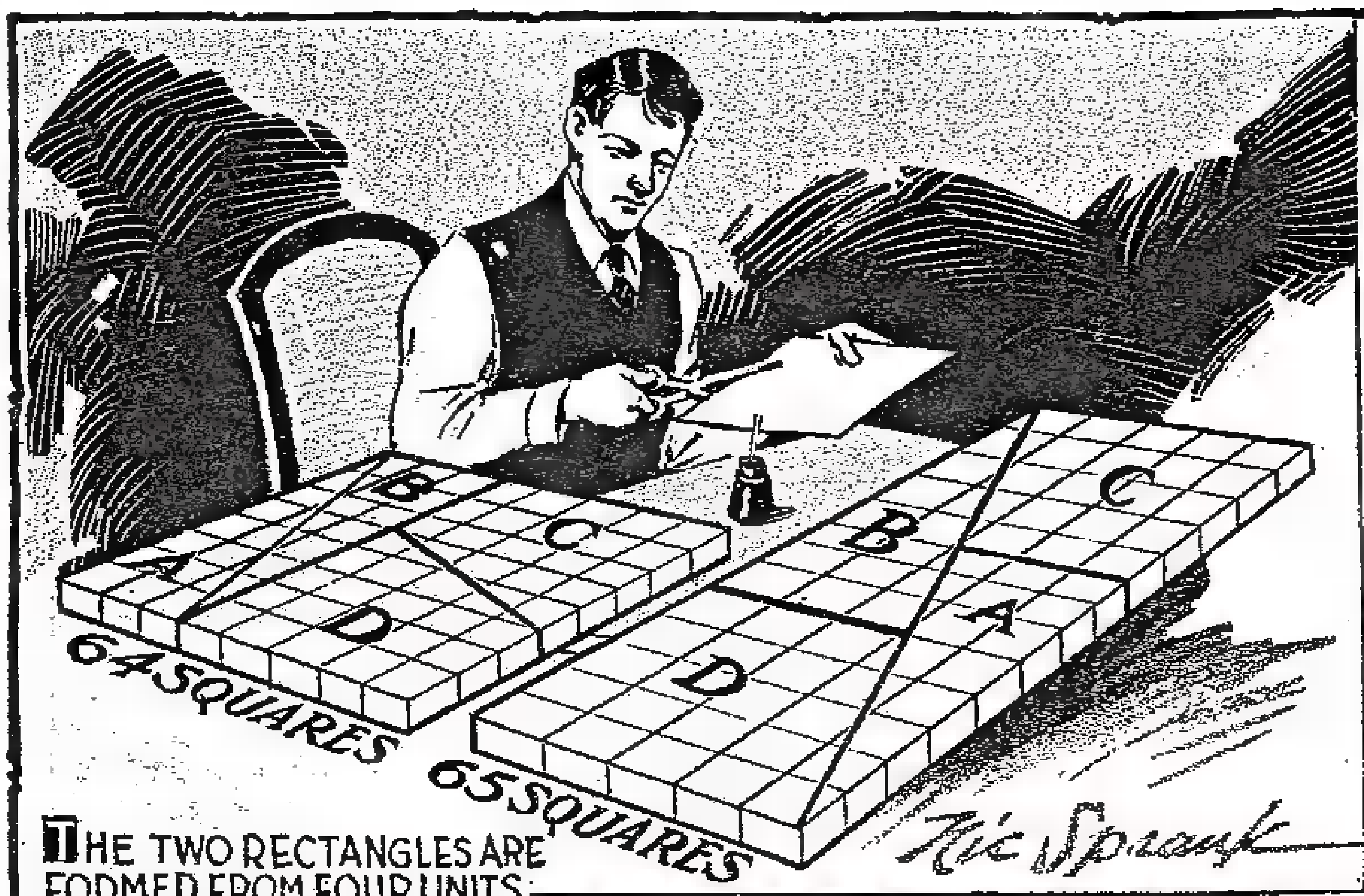
Now, where do we begin the search.

We start scouting up stream. In the gravels

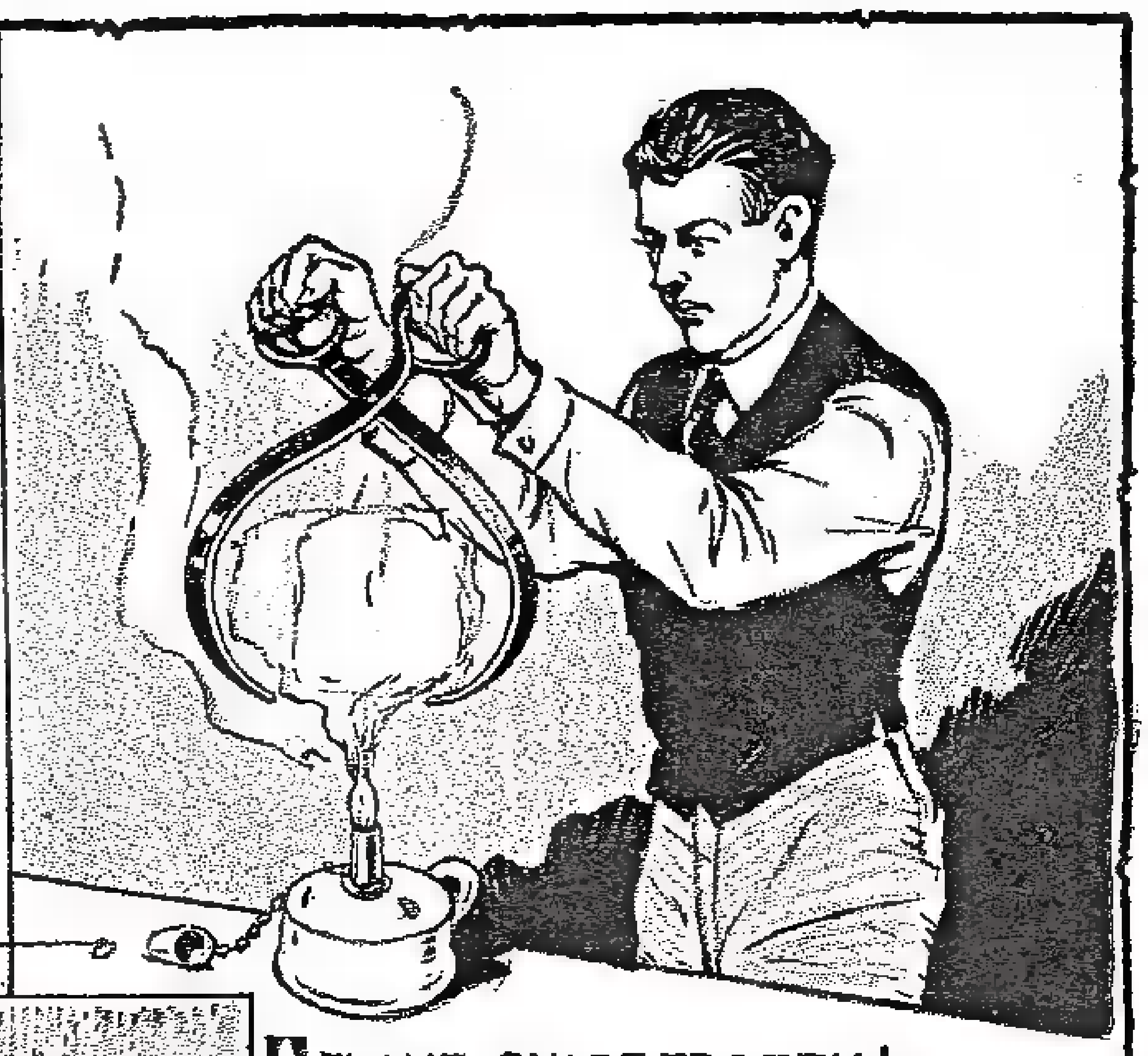
(Continued on page 141)

Oddities of SCIENCE

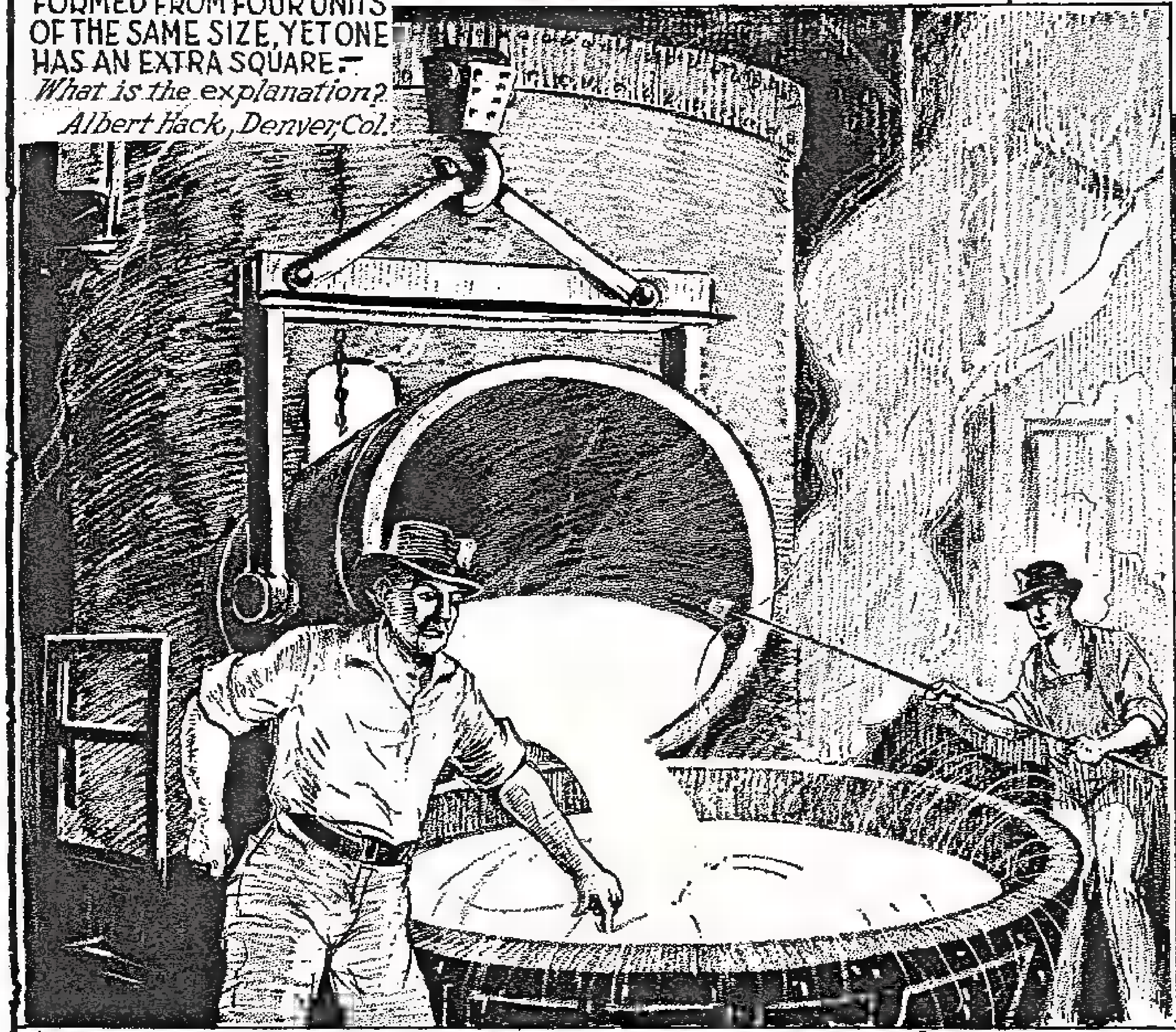
by NIC SPRANK



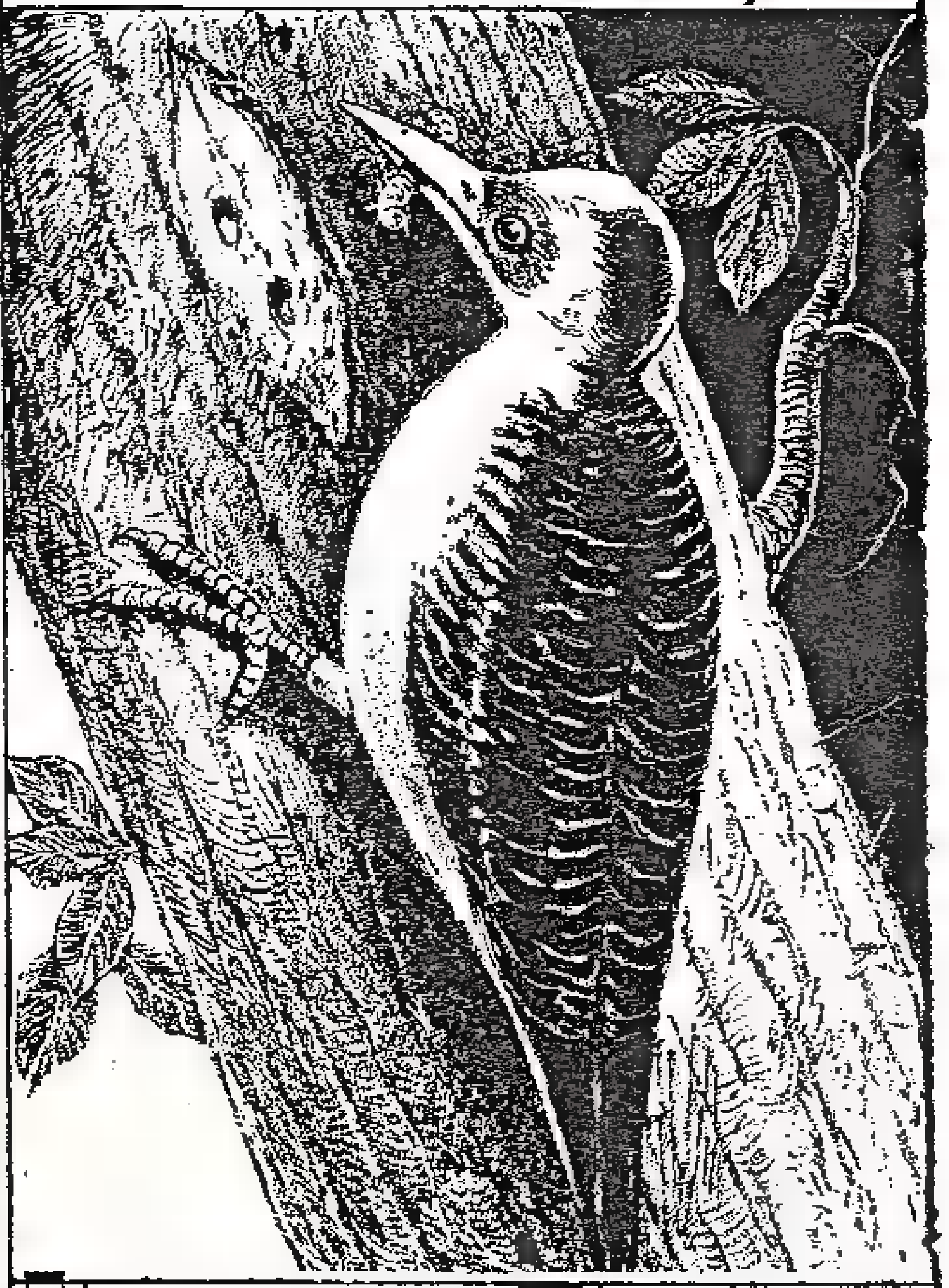
THE TWO RECTANGLES ARE FORMED FROM FOUR UNITS OF THE SAME SIZE, YET ONE HAS AN EXTRA SQUARE.—
What is the explanation?
Albert Hack, Denver, Col.



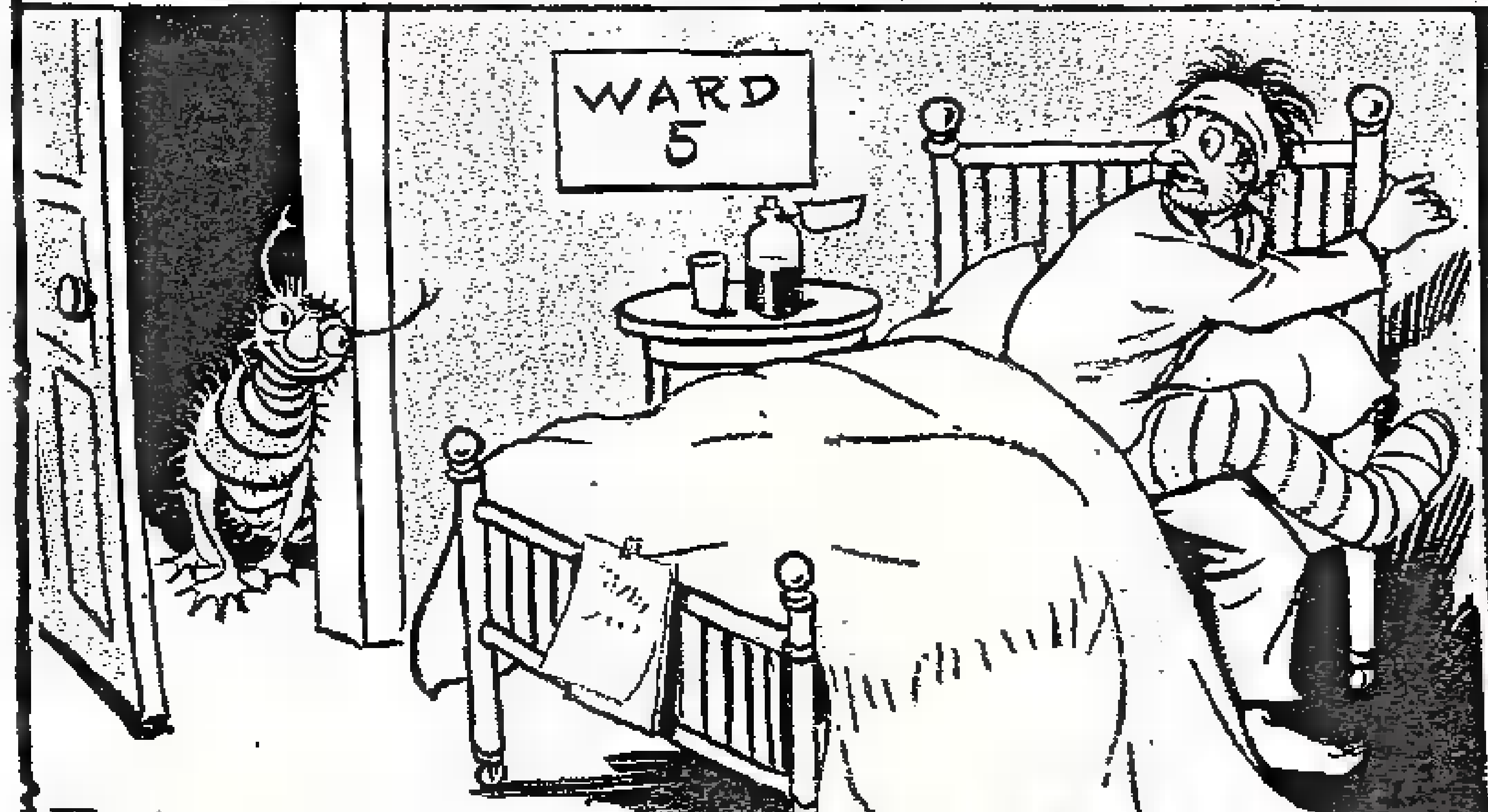
A FLAME CAN BE FROZEN!—
Lamar Bain, Shreveport, La.



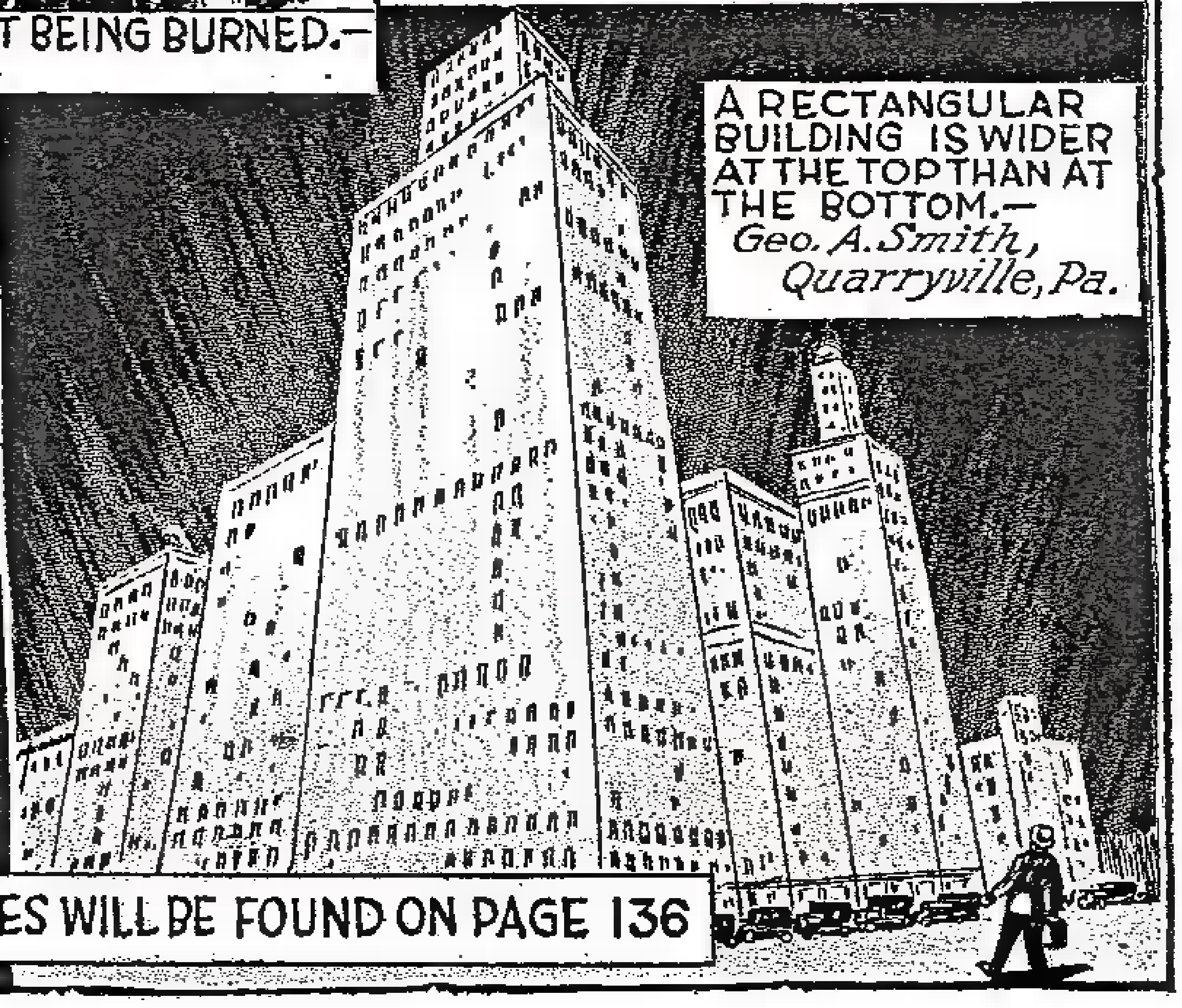
A FINGER CAN BE PLUNGED IN MOLTEN METAL WITHOUT BEING BURNED.—
Wm. Citavicus, Cleveland, Ohio.



THE WOOD PECKER IS THE ONLY BIRD THAT HAS A STOMACH.—
John Carmody, York, Neb.



OF 2000 KNOWN GERMS, ONLY ABOUT 100 ARE HARMFUL—THE REST ARE NECESSARY TO HUMAN LIFE.
—Wilford R. Anderson, Madison, Wis.



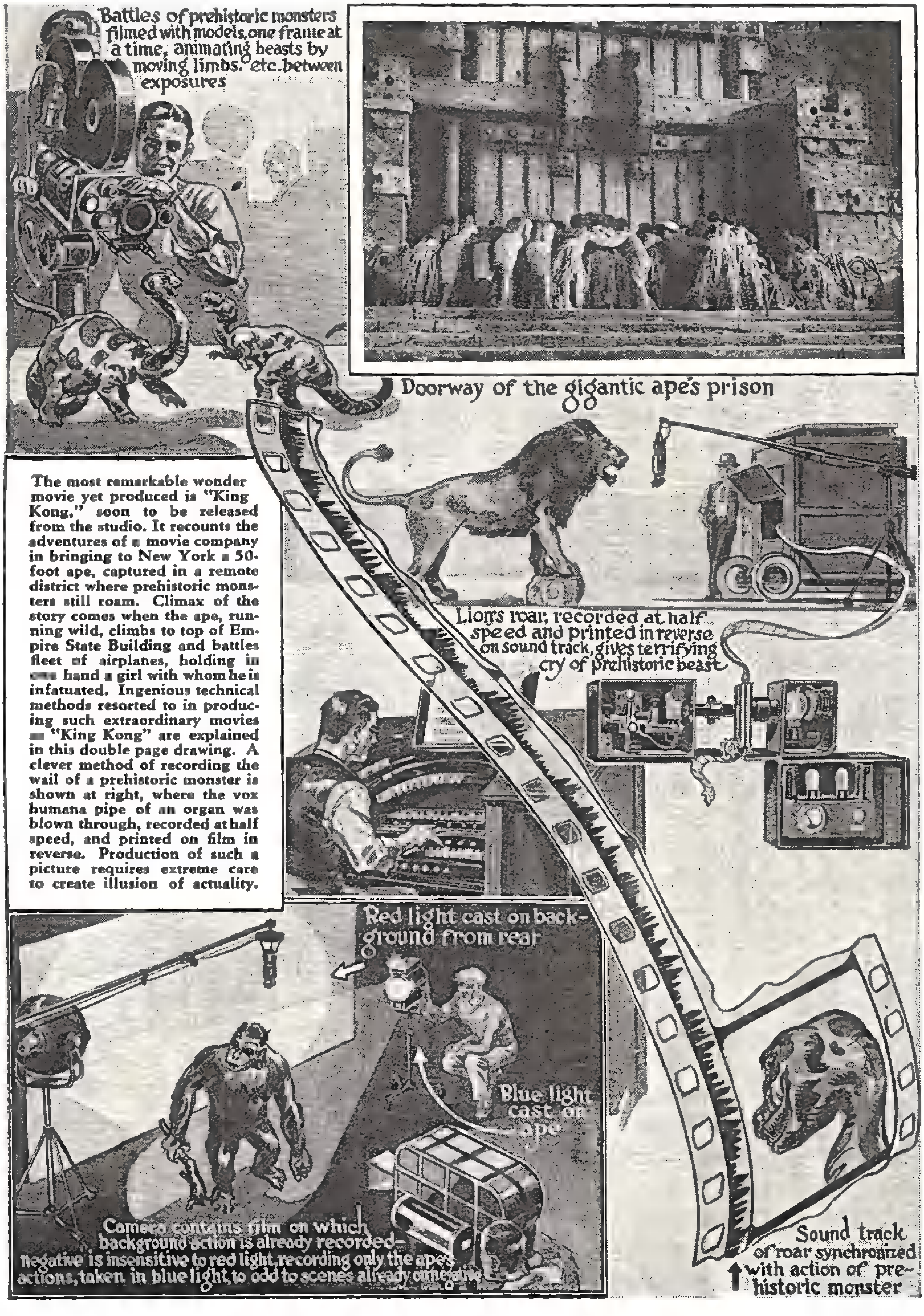
A RECTANGULAR BUILDING IS WIDER AT THE TOP THAN AT THE BOTTOM.—
Geo. A. Smith, Quarryville, Pa.

EXPLANATION OF THESE ODDITIES WILL BE FOUND ON PAGE 136

ONE DOLLAR will be paid by Nic Sprank for oddities of science used on this page. Send in your ideas—no limit to the number of suggestions you may make, but be sure to enclose proof of your statements. Maybe your ideas will be better than those shown on this page—if they are, Nic Sprank wants them and will be glad to send you a check. Address suggestions to Nic Sprank, care of Modern Mechanix and Inventions, 529 South Seventh Street, Minneapolis, Minn.

Latest WONDER MOVIE

The most remarkable wonder movie yet produced is "King Kong," soon to be released from the studio. It recounts the adventures of a movie company in bringing to New York a 50-foot ape, captured in a remote district where prehistoric monsters still roam. Climax of the story comes when the ape, running wild, climbs to top of Empire State Building and battles fleet of airplanes, holding in one hand a girl with whom he is infatuated. Ingenious technical methods resorted to in producing such extraordinary movies as "King Kong" are explained in this double page drawing. A clever method of recording the wail of a prehistoric monster is shown at right, where the vox humana pipe of an organ was blown through, recorded at half speed, and printed on film in reverse. Production of such a picture requires extreme care to create illusion of actuality.



Battles of prehistoric monsters filmed with models, one frame at a time, animating beasts by moving limbs, etc. between exposures

Doorway of the gigantic ape's prison

Lion's roar, recorded at half speed and printed in reverse on sound track, gives terrifying cry of prehistoric beast

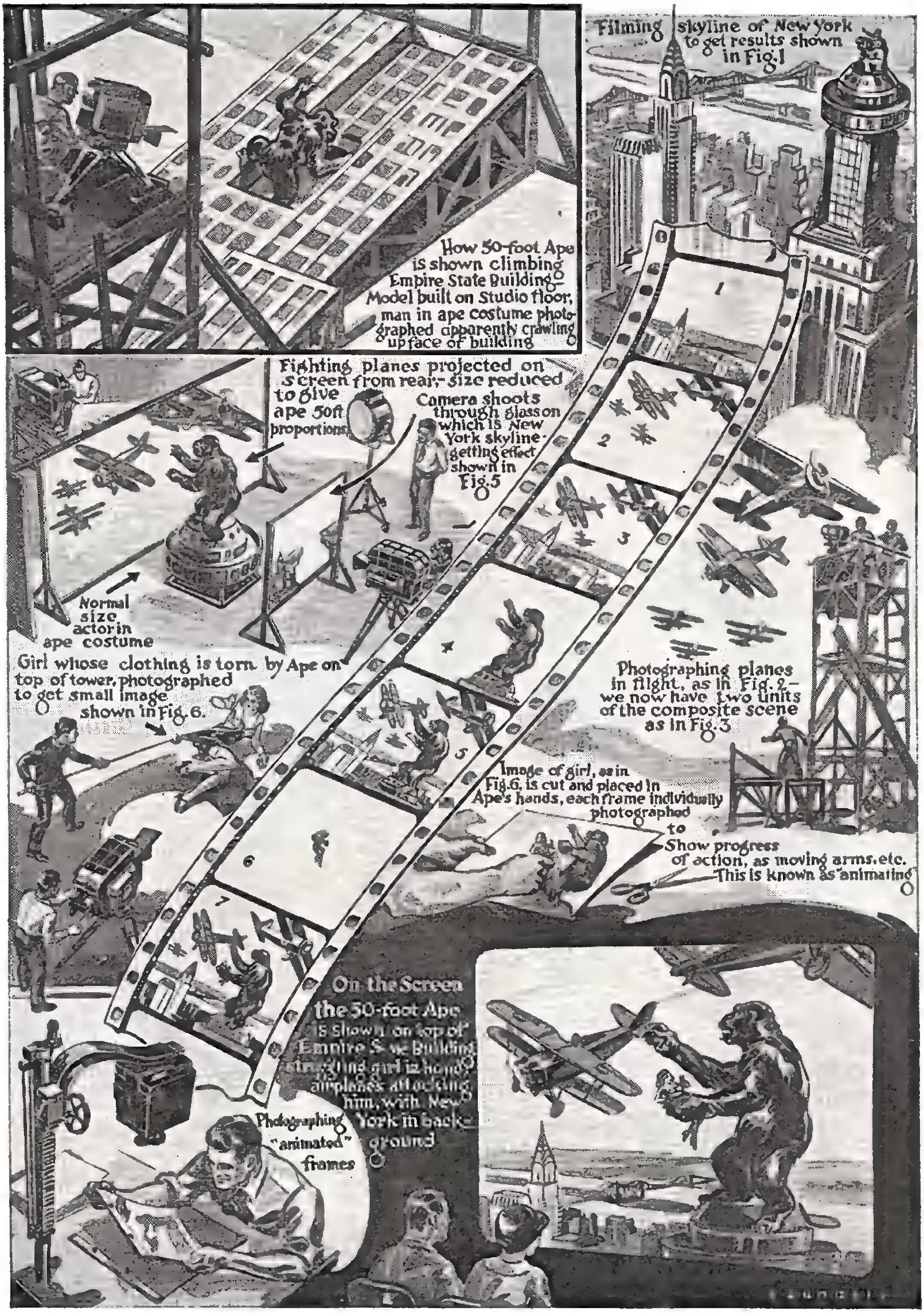
Red light cast on background from rear

Blue light cast on ape

Camera contains film on which background action is already recorded—negative is insensitive to red light, recording only the ape's actions, taken in blue light, to add to scenes already on negative

Sound track of roar synchronized with action of prehistoric monster

is TECHNICAL MARVEL



Filming skyline of New York to get results shown in Fig. 1

How 50-foot Ape is shown climbing Empire State Building. Model built on Studio floor, man in ape costume photographed apparently crawling up face of building

Fighting planes projected on screen from rear;- size reduced to give ape 50 ft. proportions

Camera shoots through glass on which is New York skyline getting effect shown in Fig. 5

Normal size actor in ape costume

Girl whose clothing is torn by Ape on top of tower, photographed to get small image shown in Fig. 6.

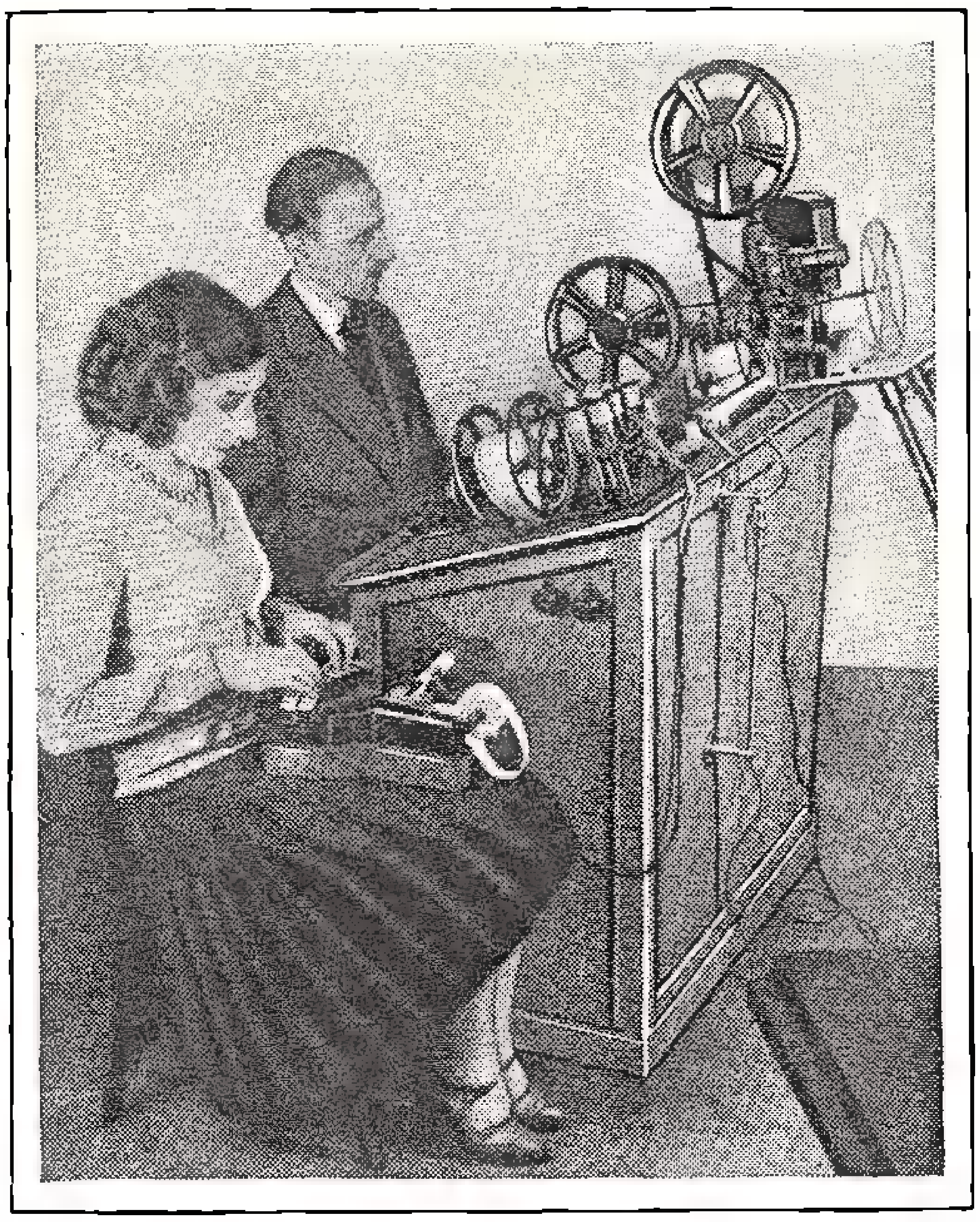
Photographing planes in flight, as in Fig. 2 - we now have two units of the composite scene as in Fig. 3

Image of girl, as in Fig. 6, is cut and placed in Ape's hands, each frame individually photographed to show progress of action, as moving arms, etc. This is known as "animating"

On the Screen the 50-foot Ape is shown on top of Empire State Building struggling girl in hand, airplanes attacking him, with New York in background

Photographing "animated" frames

Device Synchronizes Radio Actors, Music, Sound Effects



Three rows of tape passing through this machine synchronize roles of actors, music of orchestra, and noise machine to produce perfect timing in production of radio plays.

MORE interesting radio programs are promised with a new French invention which reproduces all sound effects and at the same time directs the performers with synchronized score sheets.

The noise organ produces the real sounds of ocean waves, thunder, roaring lions, etc., from a strip of film as in the talkies, thus eliminating the cumbersome studio sound imitators.

To synchronize the roles of the various program elements, the invention makes use of paper tapes on which are indicated the speaking parts for the actors, the sound effects required, and the cues for the orchestra, all of which are previously inscribed by the studio director.

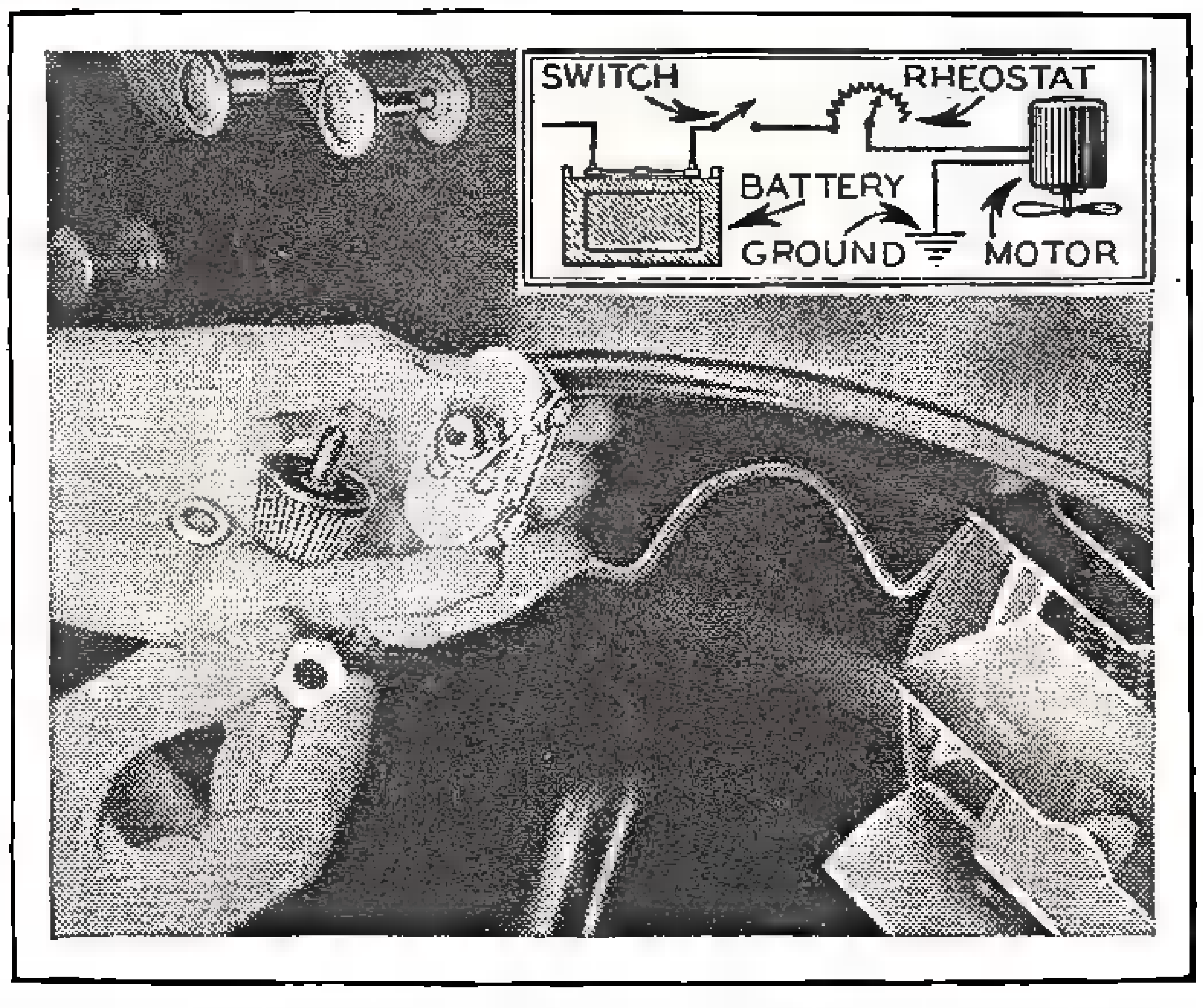
When the radio play is to be presented the three tapes are unrolled in synchronism. The speaking parts on the tape are projected on a screen, the orchestra parts unroll on the leader's music stand, while the third operates the noise organ.

The introduction of recorded noises, together with the perfect timing of all elements, is said to make better radio plays available.

Radio Rheostat Controls Car Heat

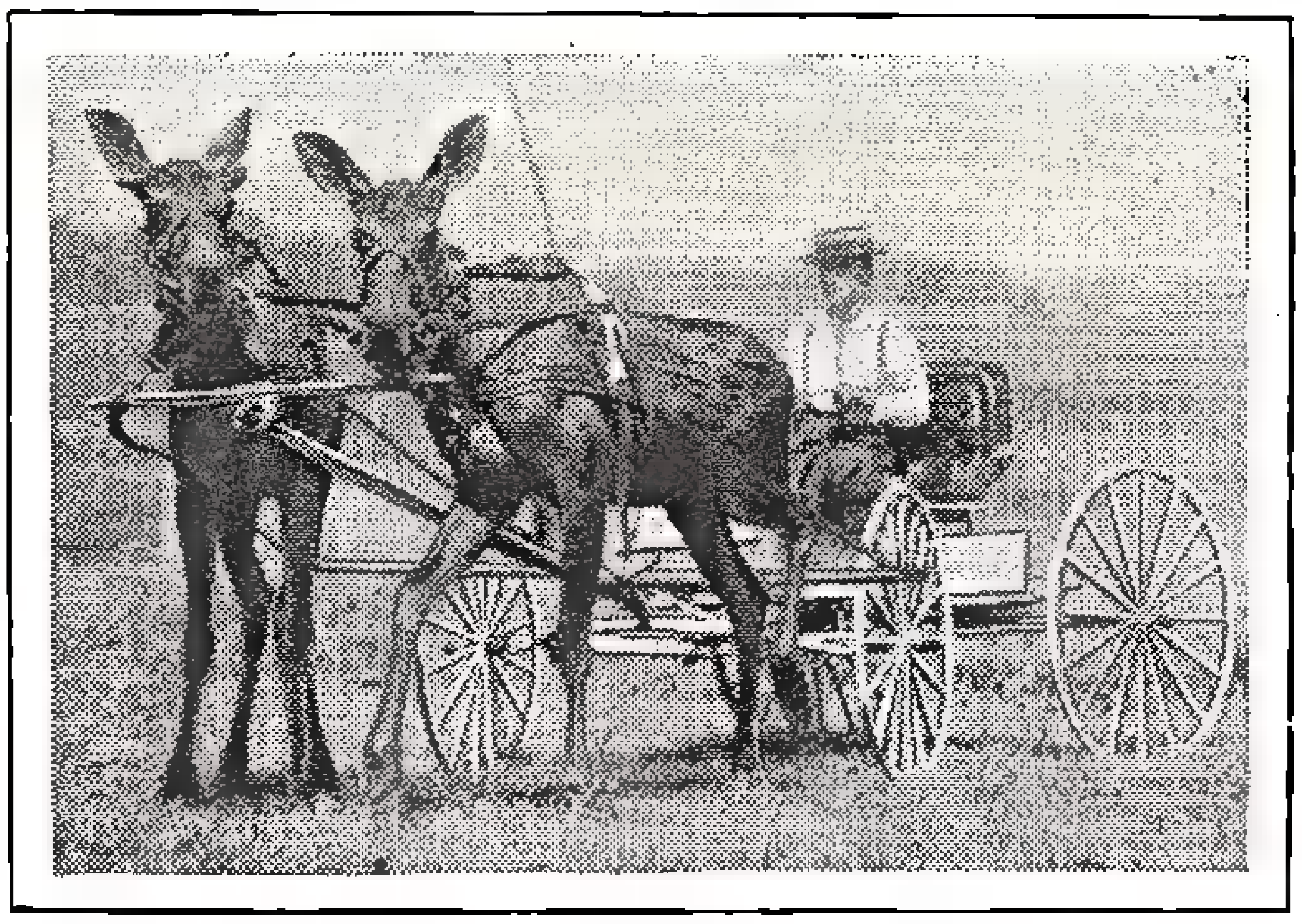
THE speed of an automobile heater fan can be controlled by a 6 ohm radio filament rheostat placed in series with one of the wires to the motor. You can mount the control permanently on the dashboard or use a bracket fastened by a bolt behind the dash.

Unless rheostat can be turned completely off, it is convenient to have a separate switch, so that the fan can be set at a given speed and turned off and on as desired without disturbing the setting. By slowing down the fan, the output of the heater is decreased, a feature highly desirable when the weather is only moderately cold.



Carbon pile rheostat is mounted on dash to control heat.

Moose Proves to be Good Horse



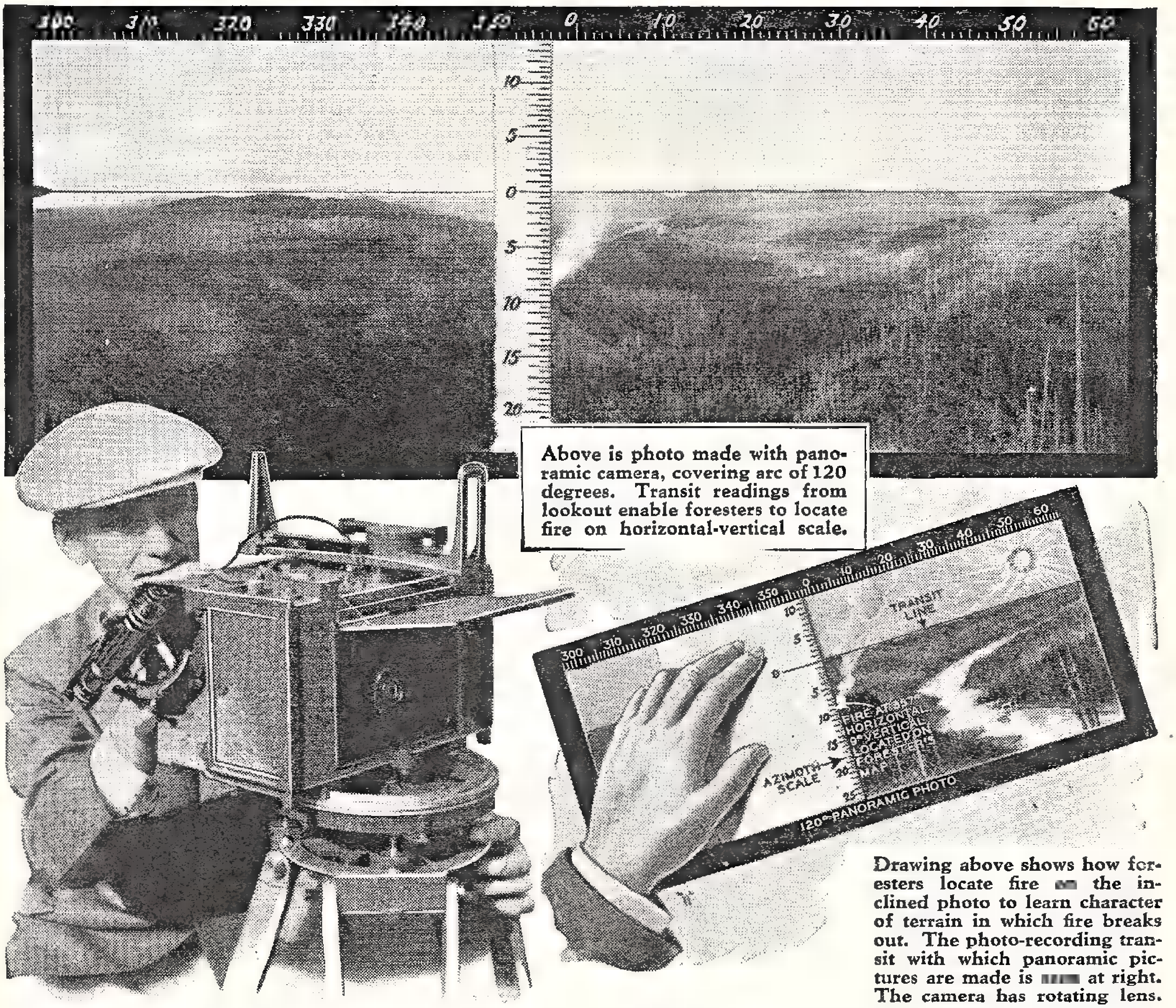
Moose prove as tractable and sturdy as horses, according to this driver, who domesticated the animals for vehicle power.

THERE'S something new in vehicular power. It's a couple of moose which have been domesticated by a Canadian of Lac au Sable, in northern Quebec. He drives them around the countryside like a couple of horses, and to date they have not been shot at.

Ostriches Have Democratic Diet

THE remarkable appetite of ostriches for almost anything is evidenced by a post-mortem on a bird long an inhabitant of the London zoo. Its stomach yielded three gloves and two handkerchiefs, three feet of string, a comb, a metal tire valve, a film spool from a Kodak, a lead pencil and various bits of wood, a clock key, a metal glove fastener, part of a gold necklace, two gold collar buttons, threepence in British money and one Belgian franc.

Panoramic PHOTOS Locate Forest Fires



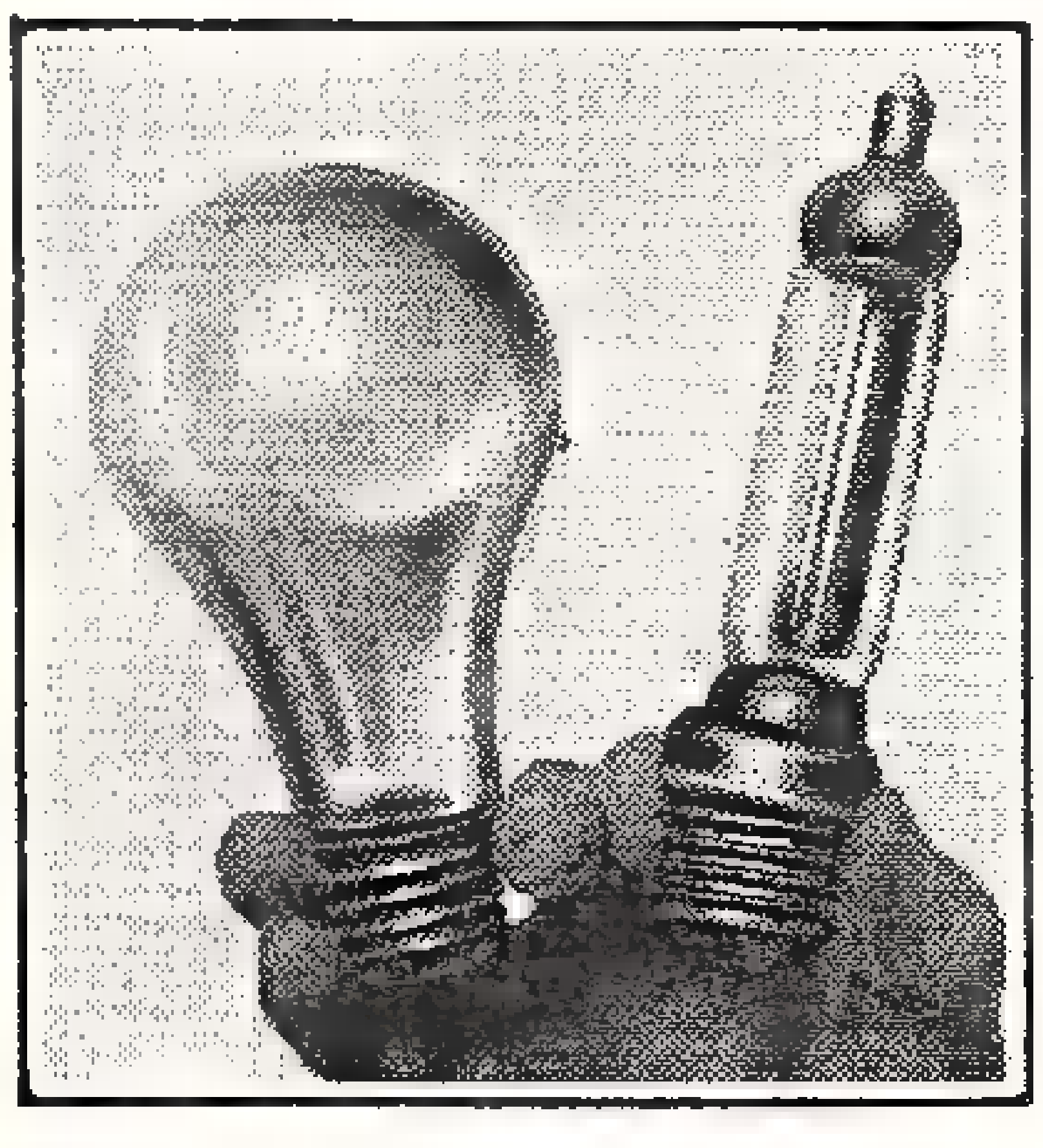
Above is photo made with panoramic camera, covering arc of 120 degrees. Transit readings from lookout enable foresters to locate fire on horizontal-vertical scale.

Drawing above shows how foresters locate fire on the inclined photo to learn character of terrain in which fire breaks out. The photo-recording transit with which panoramic pictures are made is shown at right. The camera has rotating lens.

Health Lamp Has No Filament

THE nearest approach to artificial daylight ever made is the light from an everlasting electric bulb recently put on the market. Having no filament, the bulb uses a combination of mercury and other metal vapors which produce a rich light of great brilliance and far exceeding any other type of light in ultra-violet radiation.

A thin metallic ribbon embedded in the side of the glass conducts the current to a metal cathode in the top of the tube. The current then passes through the metal vapors back to the base, forming a circuit which causes the vapors to glow. Lamp has standard type base which permits it to be screwed into any type socket.



The new artificial sunlight lamp for home or office use compared with 40-watt bulb.

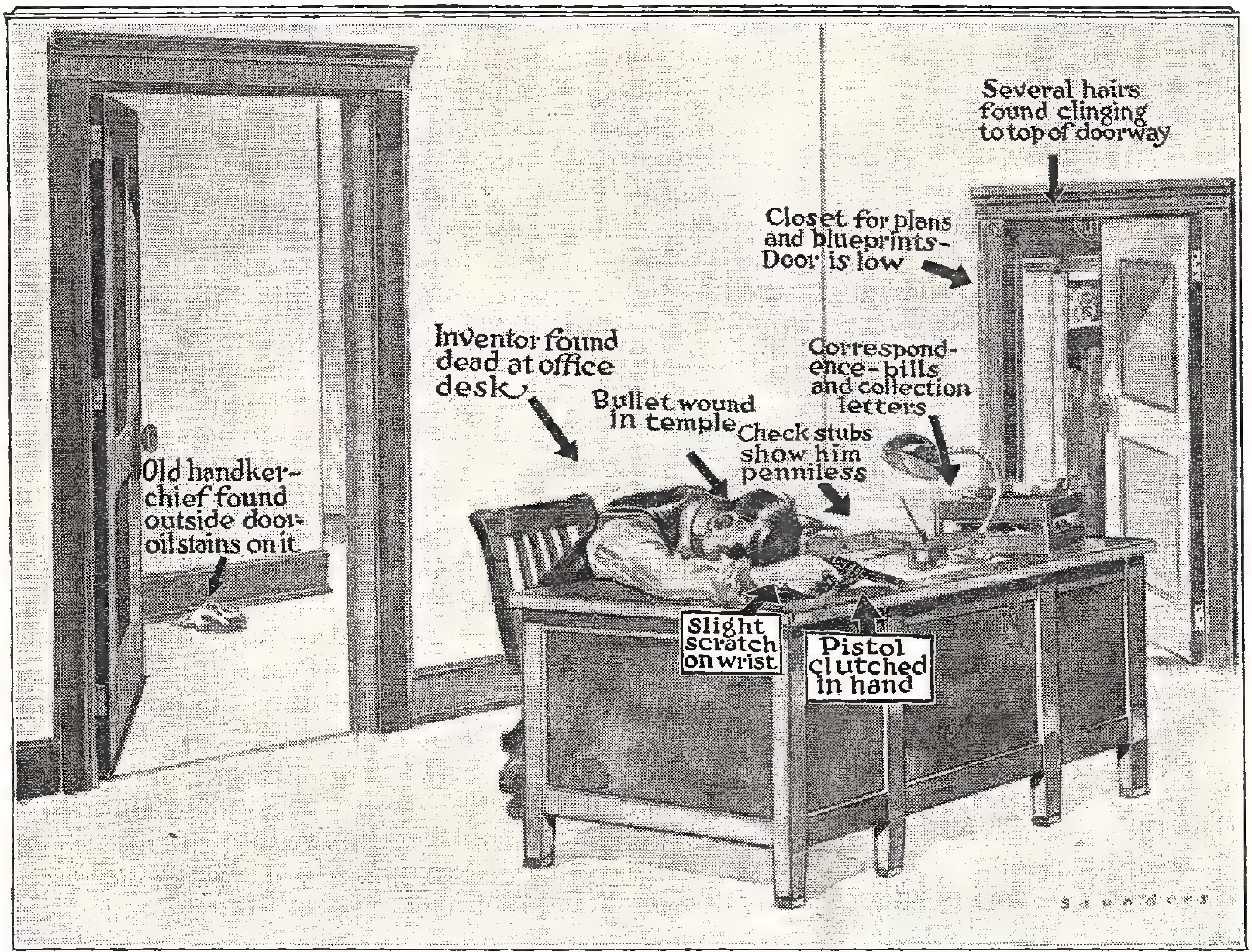
SPEEDIER location and extinction of forest fires is made possible with the invention of a new photo-recording transit recently adopted by the Regional Forester Service at Portland, Oregon.

Consisting simply of a panoramic camera with rotating lens and an attached transit, as shown in the accompanying photo, the recording device, it is claimed, will save thousands of dollars now being paid to surveying crews, since it is possible to secure a thousand or more transit readings from the same photo or set-up.

When making these photo maps of the surrounding terrain, the photographer levels the camera, sets the scale at 0 degrees, and makes a shot. This picture covers an arc of 120 degrees. Two more photos are thus made, until the entire 360 degrees are thus registered.

Such photographs are taken from every lookout station in the Northwest. When a fire is spotted by a lookout, he takes readings with a transit and telephones them to the nearest forestry station. They, in turn, take the readings on the inclined photo, and thus determine exact spot of the fire.

TAKE a LESSON from a


Several hairs found clinging to top of doorway
Closet for plans and blueprints-Door is low
Inventor found dead at office desk
Bullet wound in temple
Correspondence-bills and collection letters
Check stubs show him penniless
Old handkerchief found outside door-oil stains on it
Slight scratch on wrist
Pistol clutched in hand
Saunders

To test your ability as a scientific detective and your knowledge of recent advances in the field, see how closely you can figure out the course of procedure a scientific detective would follow out in examining the clues shown. Where would he look for fingerprints, how decide whether the case is murder or suicide? When you have done so—not before—turn to page 52 and read the answers. You are not expected to solve the crime—just decide what to do with the clues.

What do you know about the science of crime detection, aside from what you may have read in fiction? The author of this article gives you a chance to test your wits in solving a typical crime, then tells you how experts of the Scientific Crime Detection Laboratories would go about it.

UNLESS one has had the opportunity of working alongside the experts who are applying the resources of modern science to the ancient art of crime detection, the chances are that mention of a scientific detective conjures up pictures of a hawk-nosed individual with a magnifying glass and a supernatural ability to pluck amazing facts from thin air.

The magnifying lens still has its uses, but the scientific detective has lately learned so many new facts about his trade that even the man who was fully informed a year or so ago will have to make room in his mind for new ideas. Most of these advances have come from the Scientific Crime Detection Laboratory in Chicago, affiliated with Northwestern University, where a staff of experts is constantly at work.

They have learned, for example, that the age of a suspect can be determined within two or three years by a hair from his head; that the distance from which a murder shot was fired can be determined by a glance at the wound; that—

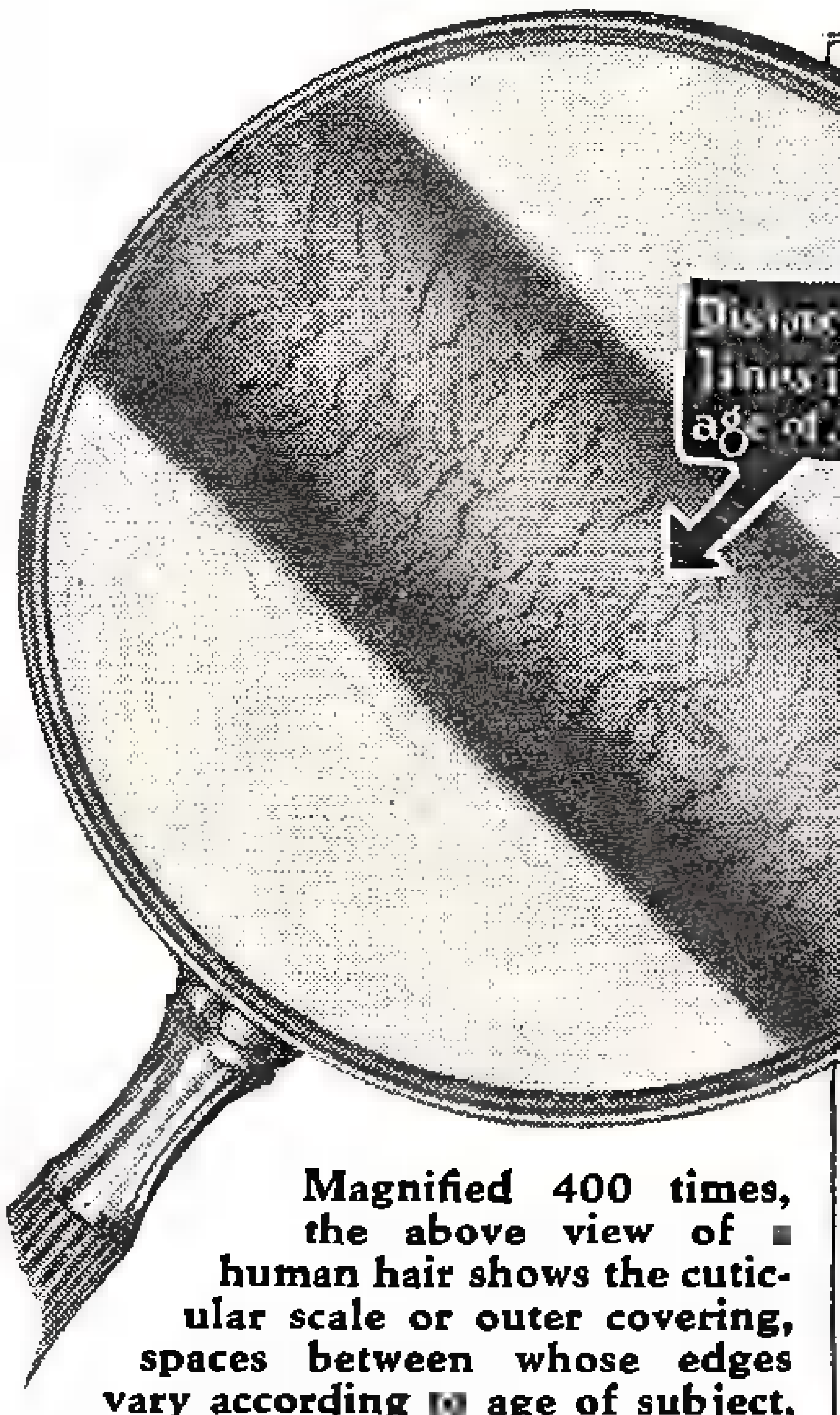
But let's take a sample crime and see how the scientists of the modern school of detection would solve it:

One Matthew Donaldson, aged inventor, is found dead at his desk in the little office-living room of his home. The fatal bullet wound is in the temple. Clutched in his hand is a pistol.

Dusted for fingerprints, the gun reveals only those of Donaldson. Ballistics tests show that the fatal bullet actually was fired

Scientific Detective

by VICTOR EDWARD BARNES



Magnified 400 times, the above view of a human hair shows the cuticular scale or outer covering, spaces between whose edges vary according to age of subject, enabling age of unknown suspect to be determined within two or three years. At right, police agent from India studying firearms at Scientific Crime Detection Lab.

by this gun, not by some other. Ballistics is the science of determining by markings left on the bullet in its passage through the barrel exactly what gun of all the millions in existence fired that particular slug. No two gun barrel interiors leave identical marks on their bullets, just as no two individuals' fingers leave identical prints. You get your death bullet, fire a test bullet from the suspected weapon, and if that test bullet's markings are the same as those on the death bullet, then beyond all doubt the suspected weapon did fire the fatal shot.

Murder or Suicide?

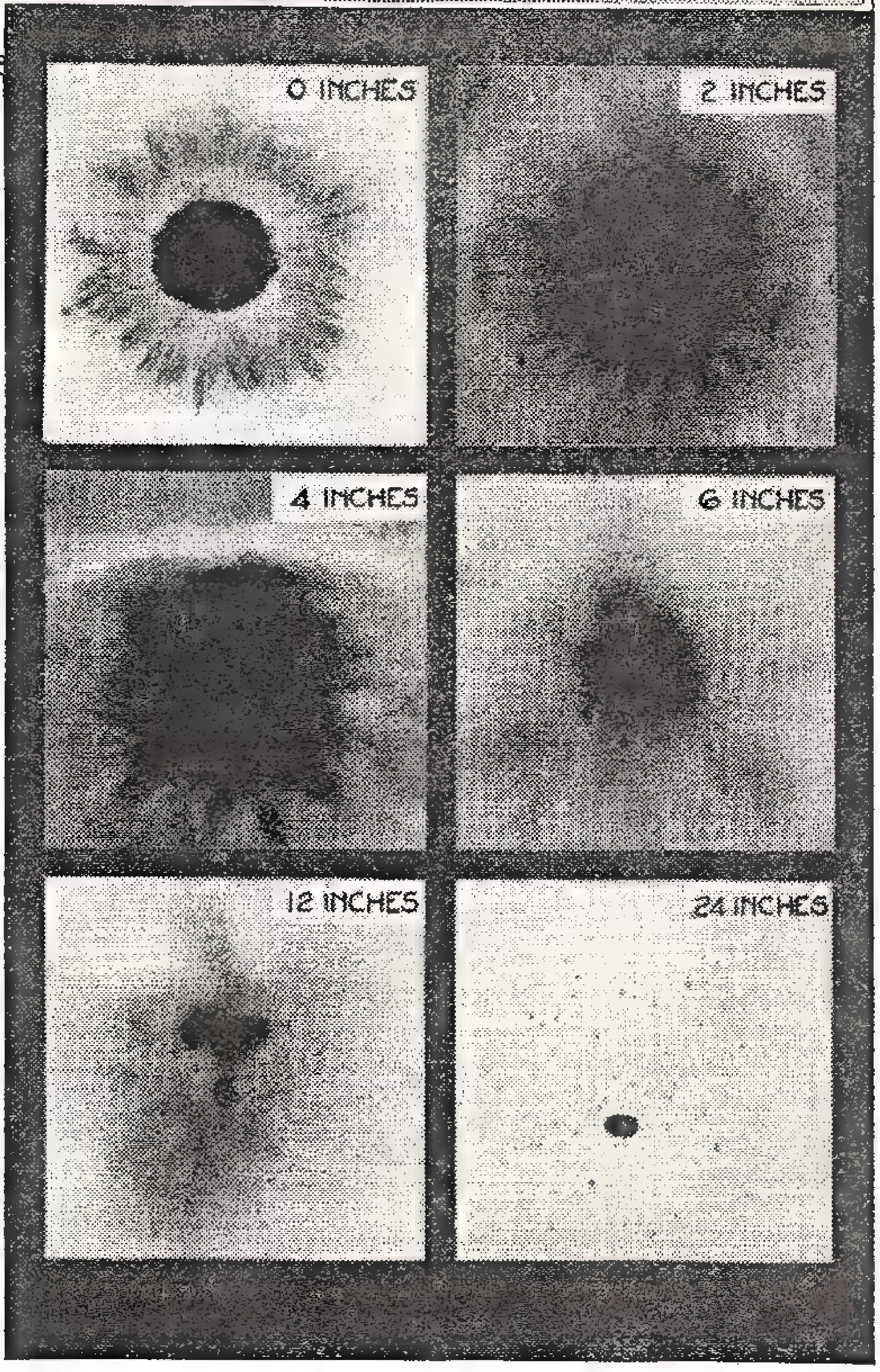
Correspondence in the inventor's desk shows that creditors have been hounding him for payment. One letter, from his bank, threatens foreclosure of a mortgage on his home and shop, all he owns, if he does not at once repay an overdue loan. His check stubs show that he is penniless. Apparently a clear case of suicide by a man grown desperate in a losing struggle.

But scientific detection, having already identified the death gun, steps in again. The gun seemed just *too* clean, aside from the victim's fingerprints.

Microscopic examination reveals tiny cotton fibres clinging to it. The gun has been wiped clean. By whom? And why?

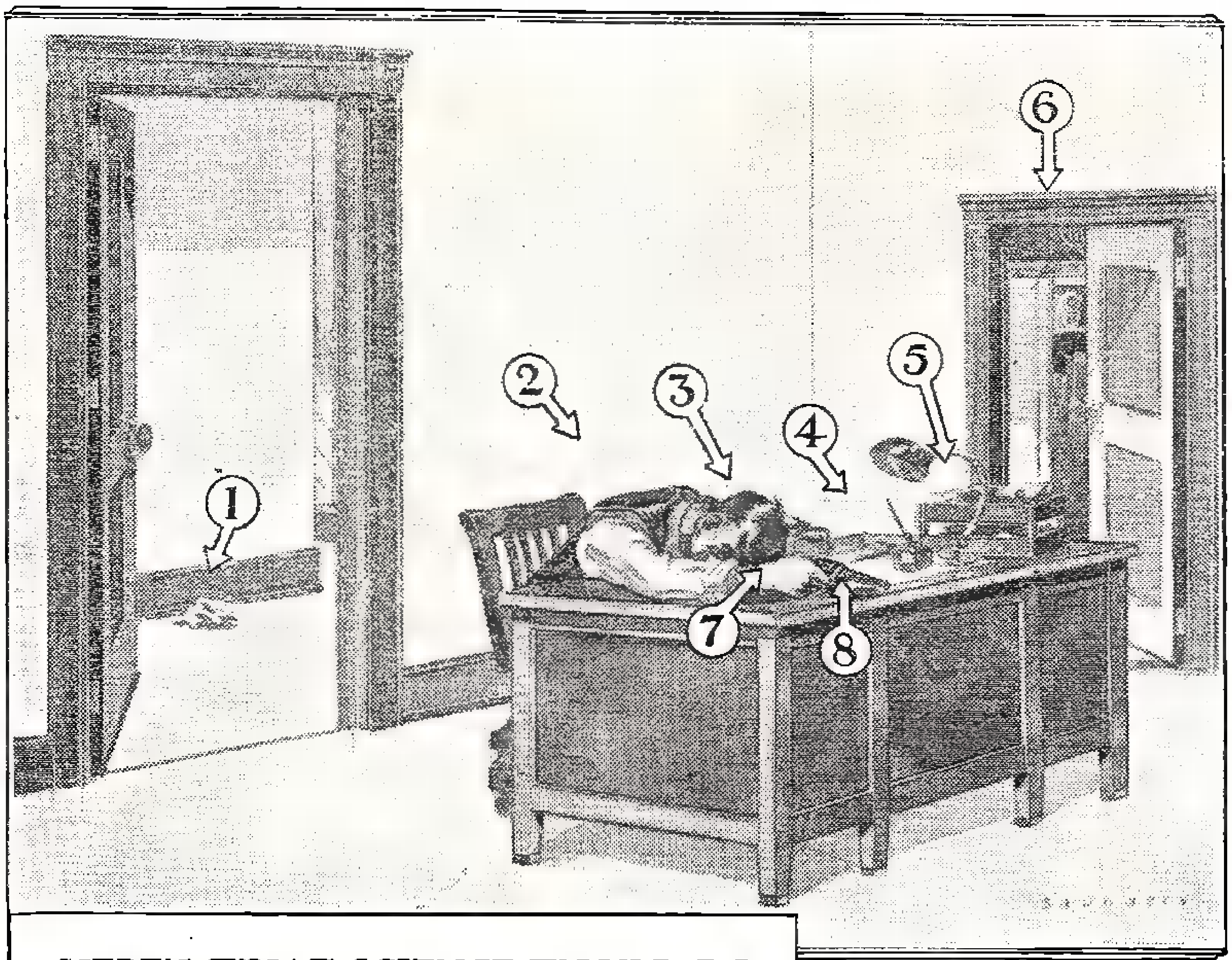
The gun numbers have been filed away. This can only be an effort to prevent tracing of this gun. But if the inventor intended to commit suicide, why bother about that?

An inspection of the flesh around the temple wound settles it all. The inventor



How burn patterns around bullet wounds vary with range and types of powder and guns used. From study of charts like these, the scientific detective can determine at a glance from what distance bullet was fired and what kind of ammunition was used. Background squares are of white paper.

Here's What a Scientific Detective Would Do With Clues on Page 50



did not contemplate suicide, nor did he commit suicide; he was murdered. For on his temple is a pattern of tiny burns, made by flying granules of the blazing gunpowder as the shot was fired, and it is a pattern that the scientific detective knows *could not* have been made at any range up to arm's length, the farthest the inventor could have held the gun from him and retained it in his hand, where it was found. Various types of powder, fired from gun barrels of varying lengths, make their own distinctive burn patterns, and these patterns vary with every variation in range, be it even so slight as half an inch.

Murder, and a gun that defies tracing. But it will be traced, nevertheless. Etching reagents will be applied to that filed surface, and under their influence the vanished numbers will be brought back as easy to read as the day the die first struck them. Then the maker will tell from his records what jobber the gun went to, the jobber what retailer, and the retailer what individual finally bought the weapon and walked away with it—*his* gun. Restoration of numbers filed from a steel surface is simple. When the die first stamps the numbers, its force disturbs the molecular structure of the steel itself, and this disturbance, line for line with the die, extends deep into the steel. Invisible to the naked eye, the lines of disturbance show up readily under the etching reagents.

Outside the door of the inventor's office a handkerchief is found on the floor. Analysis will show its cotton fibres the same as those on the gun, and faint spots on the handkerchief to be oil from the gun. Here, dropped unnoticed as the slayer fled, is the cloth that wiped off the weapon to remove the killer's fingerprints before it was placed in the victim's still-warm hand to receive his own.

Still there is no clue to the identity of the slayer. The only hope lies in that handkerchief. But this is old and worn, without even a laundry mark.

Wait! Since it is old and worn, it must have been washed many times. Perhaps there was at one time a laundry mark that has now faded to invisibility through repeated washings. Placed under the ultra-violet ray, this vanished mark reappears,

HERE'S WHAT SCIENCE WOULD DO WITH THE CLUES:

1. The handkerchief is analyzed, its cotton fibers found to be identical with some on handle of gun. Oil spots prove to be oil from gun indicating handkerchief was used to wipe gun handle clean of fingerprints. No marks appear on it, but under ultra-violet light an old laundry mark reappears, which is traced to laundry.

2. This merely refers to position of body.

3. Inspection of bullet wound in temple discloses gunpowder burns. Pattern of burns, compared with scientific charts, proves shot must have been fired from distance greater than arm's length; hence case is murder.

4, 5. Check stubs and papers apparently show victim penniless; most are dunning letters. All are placed under ultra-violet light, and hidden writing is disclosed in one casual letter containing a death threat.

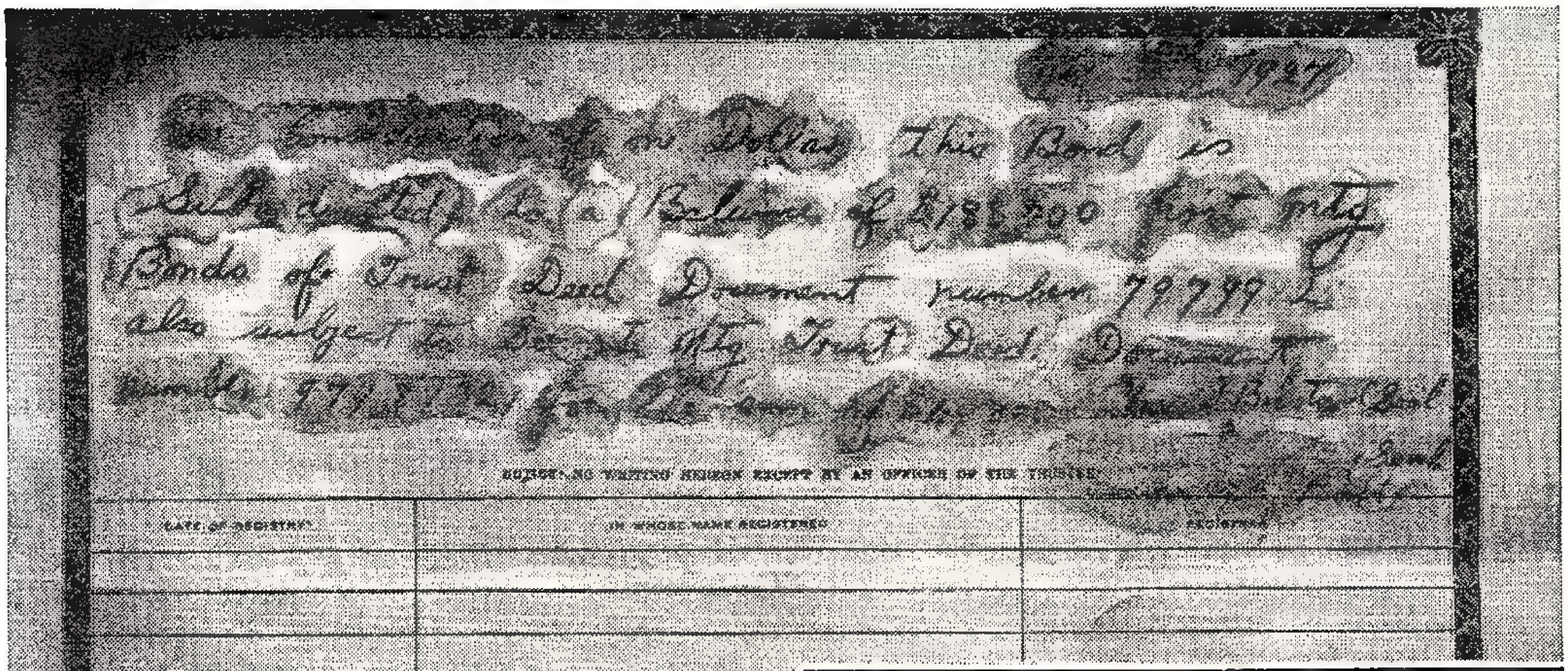
6. Hair clinging to wood is severed, as if someone had bumped head in entering cabinet, giving hint as to height of man. Under microscope, hair texture and cross section prove it to come from a Caucasian (hair varies in shape according to race) and likely from a robust man, since hair is rugged. Age rings of the hair prove subject to be between 36 and 38 years old. (Age can be determined within two or three years by spaces between the cuticular-scales covering a single hair.)

7. Scratch on wrist is carefully examined. Apparently wound was made by killer when dead man sought to defend himself, killer scratching him with fingernail. Microscopic lump of "fingernail scrapings," taken from wound, discloses tiny steel filings and grease, indicating that killer is a mechanic or worker in engineering trade.

8. Gun is dusted for fingerprints, revealing only those of dead man. Ballistics tests made to prove that killing was actually done by this gun, not by some other. (Every gun leaves distinctive markings on bullets fired from it.) Microscopic examination discloses cotton fibers clinging to gun handle, indicating it has been wiped clean by cotton cloth, apparently to remove killer's fingerprints. Serial numbers have been filed away. These are made visible again by an acid reagent.

Following out the leads given by all these clues, the scientific detective is able to locate the killer, as explained in detail in the text. Note the number of new methods made use of, such as determination of age from hair, and restoration of die-stamped serial numbers on gun which were completely filed away!

Vanished Writing, Filed-off Gun Numbers, Restored by Scientific Magic



In ordinary light, this bond appeared perfectly blank, so cleverly had the writing been erased with chemicals. Placed under the ultra violet ray, the vanished writing reappeared, clear enough to be reproduced in the photograph.

bold and clear. The chemical substance of the ink, though vanished on the surface, has remained imbedded in the heart of the tiny threads.

With this to go on, a man is sent to check laundry records and learn to whom this mark was given. Most laundries keep such records to facilitate return of lost articles to their owners.

At the scene, search for the motive is begun. All papers on and in the victim's desk are inspected. Nothing, apparently, except duns, half-finished plans, copious notes, a few casual letters from acquaintances.

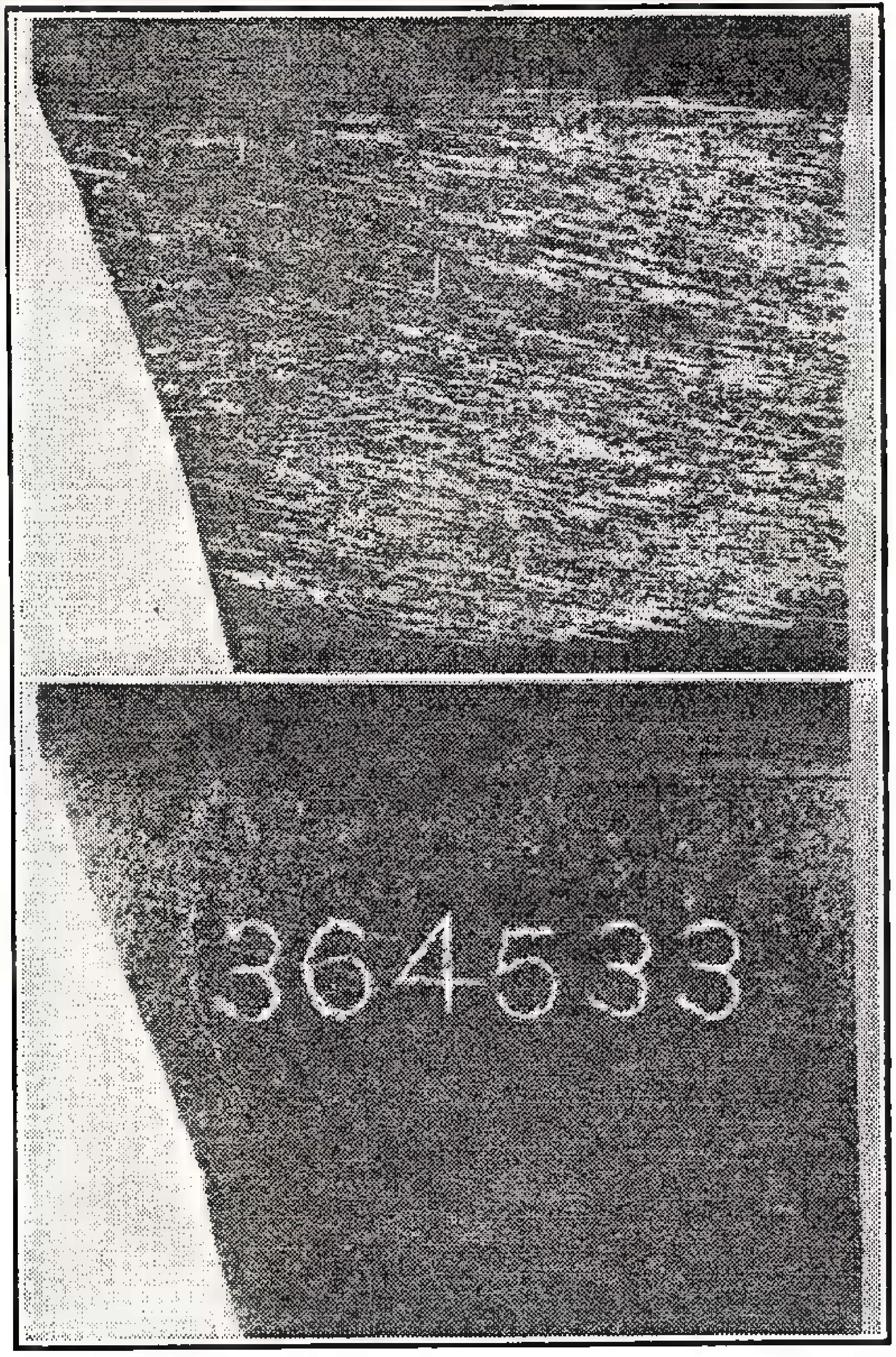
Invisible Ink Made Visible

But the scientific detective doesn't believe all he sees. In fact, he doesn't even believe he sees *all* until he has proved beyond doubt that there is no more to be seen.

He places these papers one by one under the ultra violet ray. And there, suddenly, in one of those apparently casual letters, he finds, between the lines visible by ordinary light, a threat against the inventor's life. Surrender of rights to an invention is demanded as the price he must pay to escape death.

There are numerous chemical compositions known as invisible inks, but nearly all stand out boldly under the ultra violet ray. It is a very illuminating little ray for the scientific detective, in more ways than one.

A brief search reveals no plans for an invention such as the one mentioned in the death threat. There has been robbery as well as murder, then. And note: everything learned in this case so far has been learned as a result of the application of scientific knowledge.



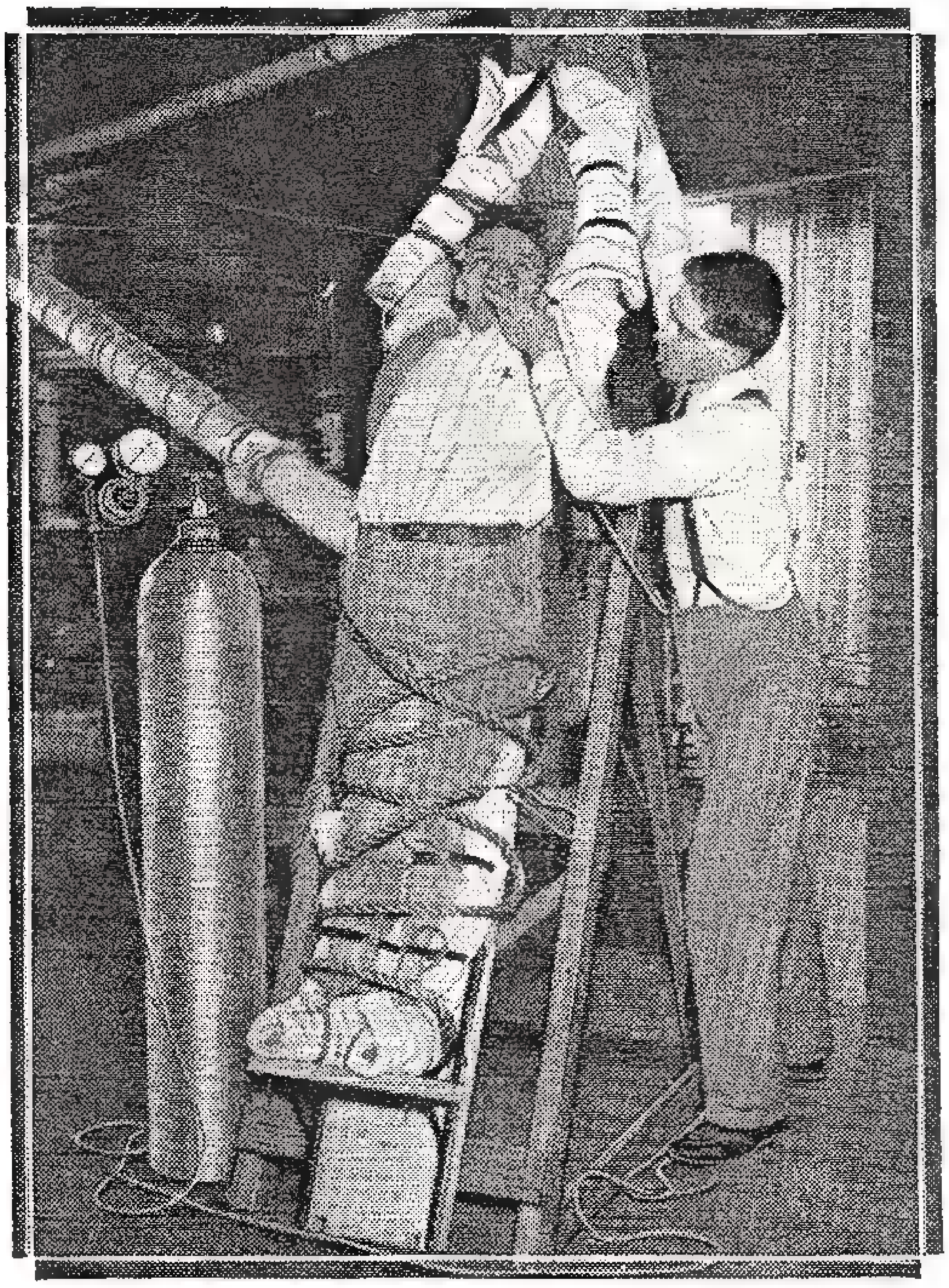
Top photo of this group shows highly magnified steel surface of gun from which serial numbers have been filed. Below, same surface after etching reagents had been applied.

Numerous other invention plans are found in a cabinet in a closet at one side of the room, but there is no evidence that the plans in question have been removed from this chest, or that they ever were in it.

The door to the closet is low. One must

(Continued on page 138)

Dead Brought to Life by See-sawing Body, Feeding Oxygen



Life is restored to body by strapping it to board which is rocked up and down like child's see-saw, starting blood circulation. During this procedure oxygen is fed through mouthpiece.

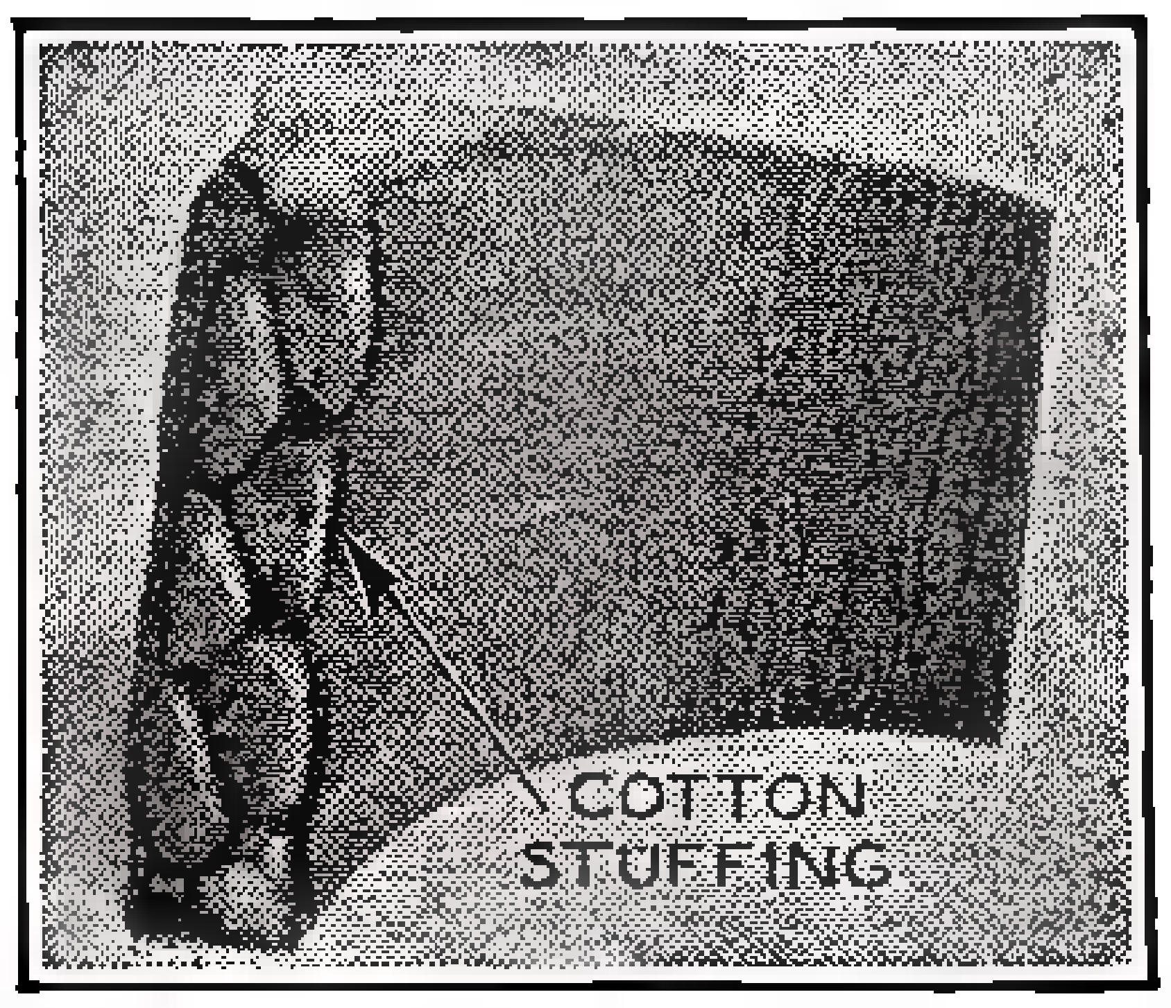
THE dead are actually brought back to life with a device which scientists have given the prosaic title of teeter-totter. The subject whose life has expired is strapped onto a board that is rocked up and down during the life-restoring procedure like a play-ground see-saw. The inventor, Dr. Robert E. Cornish, of the University of California, claims that this motion starts blood circulation in the dead body.

While the rocking is going on, the attendant feeds the subject oxygen through a mouthpiece connected through a hose to the oxygen tank. Artificial heat is also applied to the body to increase circulation.

Shaded Lights Harmful to Eyes

BRIGHT light throughout all parts of an office or work-room is better for good seeing than even brighter light from a desk lamp or spot light, which leaves the rest of the room in darkness. The reason seems to be that reasonably bright illumination is necessary in order that the center of retina shall work to its best ability.

Cotton in Tire Prevents Puncture



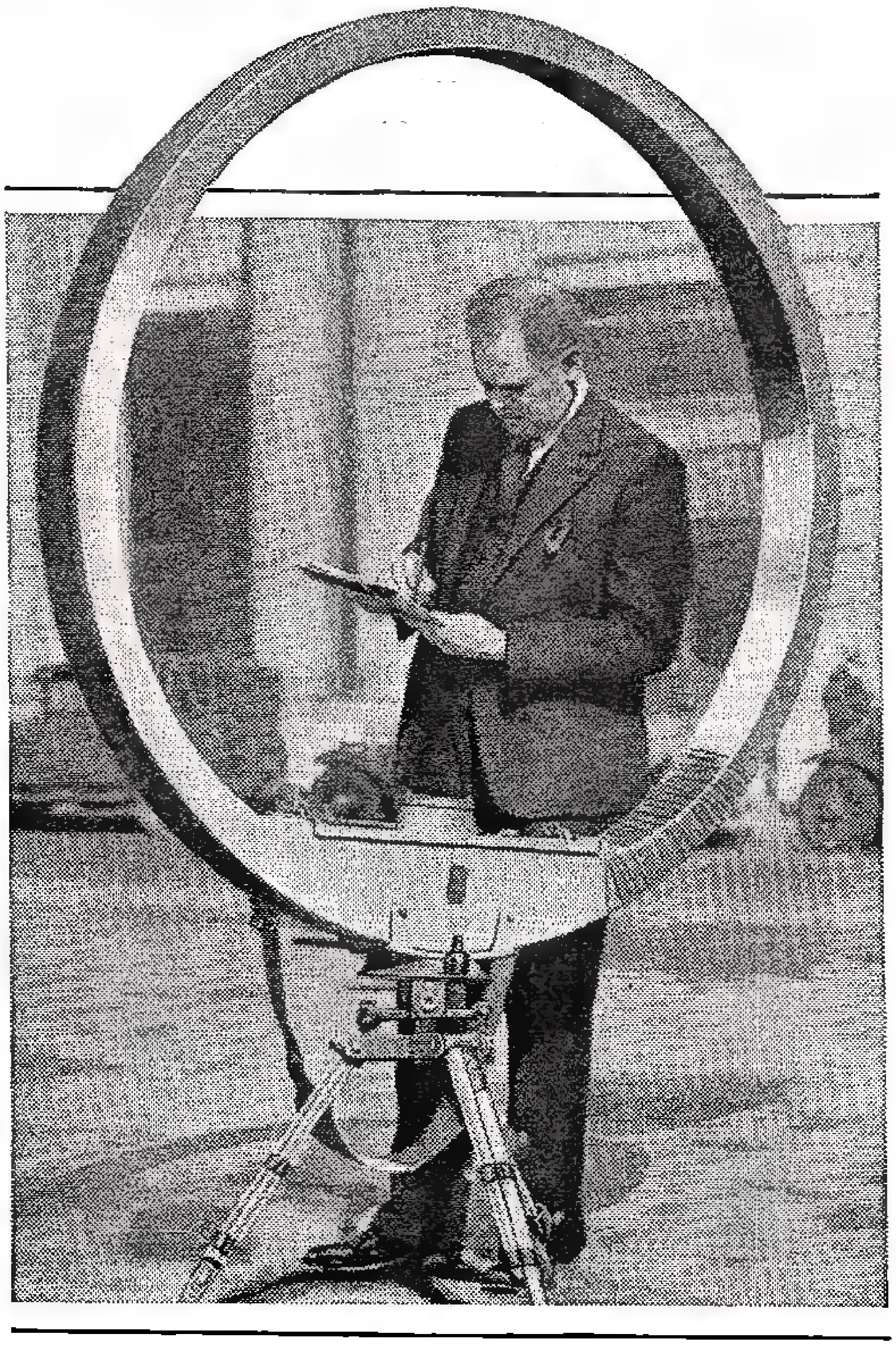
Cotton wadding in cells prevents puncture by bullets and nails.

WHEN a southwestern doctor discovered that his stickpin could not be pushed through the cotton in his necktie, he hit upon a new idea, and the result is the development of a low-priced puncture proof tire, a cross section of which is shown at the left. When a nail penetrates the skin of the tire it is stopped right there by the cotton wadding. Note the cellular construction, the purpose of which is to prevent the shifting of the cotton. Tests showed the tires both bullet-proof and puncture-proof.

Radio Loop Locates Ore Veins

GOLD prospectors, amateur and professional, will welcome a radio ore locator recently developed. The machine, shown in the photo below, operates on principles similar to the radio direction finder employed on ships to determine their positions in a fog.

No constructional details on the ore locator are available, save the fact that it consists essentially of an insulated loop of wire over an iron core and terminating in a pair of lights which glow when a vein of ore is in the vicinity. Prof. Frank Grock, of Los Angeles, the inventor, is shown with his invention below.



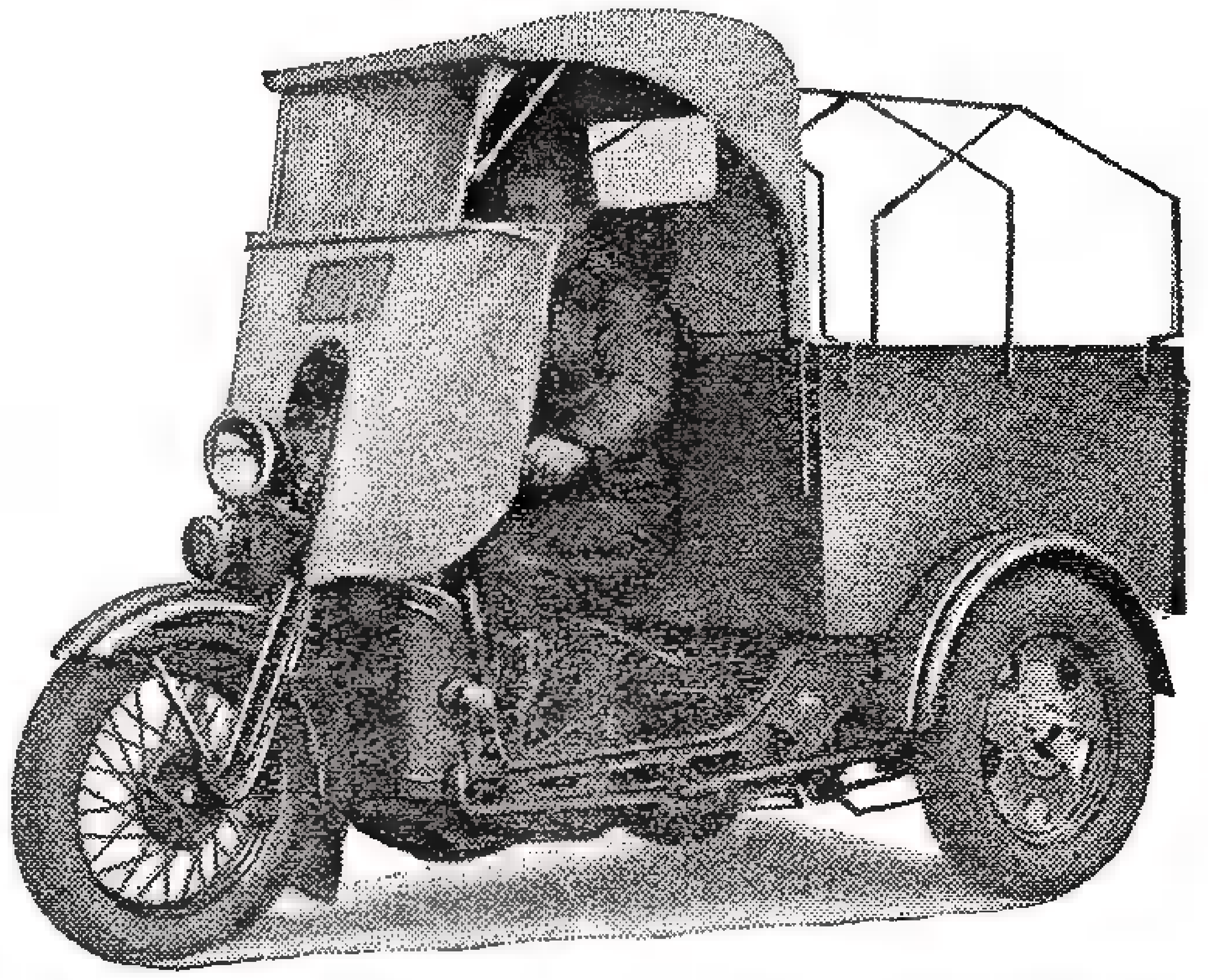
When this radio ore locator, similar to radio direction finder, is brought in vicinity of ore vein, lights on meter panel glow.

Three-wheel Motorbike Is Ideal Rapid Delivery Truck

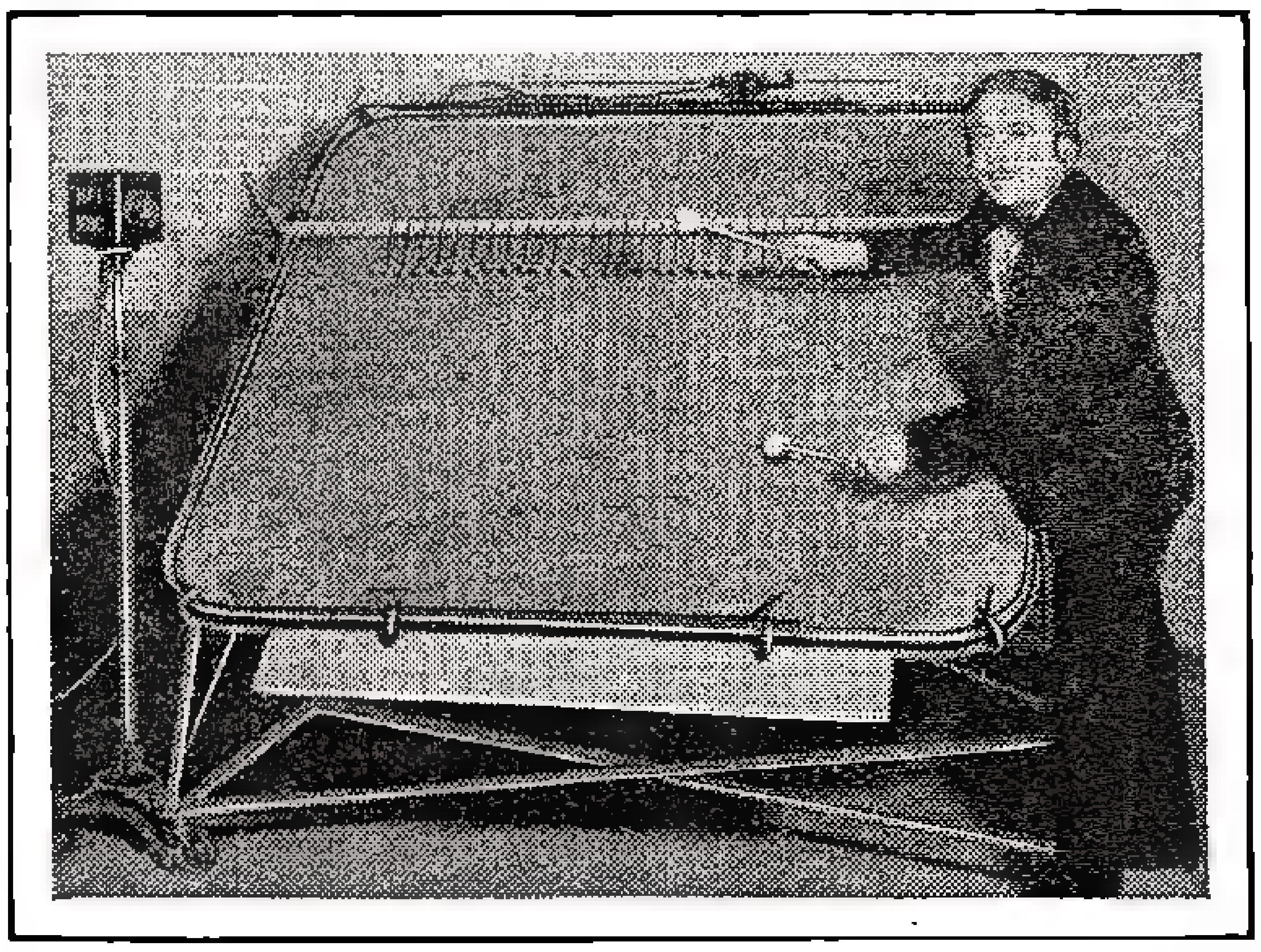
AN INNOVATION in motorcycles has recently made its appearance in the form of a miniature three-wheeled truck. The new vehicle has a 20 horse power motor and is equipped with an emergency brake like those used on automobiles.

The compartment for goods is very large as you can see in the photograph at the right and may be covered over with canvas in rainy weather by means of clasp-eyes installed on the sides of the compartment.

The driver of the vehicle is protected by a windbreak and a convertible top. A generous glass windshield is also provided as well as metal shields for the legs. Steering is effected with the standard handlebars.


Ideal for rapid delivery, this new three-wheeled truck with 20 h.p. motorcycle engine and regulation handlebars has large compartment for goods in rear, protected by canvas.

Produces Realistic Radio Thunder


When drum-head skin stretched over steel frame is struck by mallet, small lead balls suspended from cross piece bounce about to produce realistic after-rattle of thunder.

A THUNDER drum invented by a Los Angeles radio sound expert is interesting for its construction as well as for its remarkable fidelity before the radio mike. It consists of a heavy steel frame over which is stretched a drum-head skin adjustable in tautness.

About a foot from the top an iron bar extends across the face of the drum and affixed to this by steel strap springs is a series of small leaden balls. When the drum is struck the leaden balls resting against the taut skin produce the characteristic after-rattle of thunder, giving a very realistic and thrilling performance.

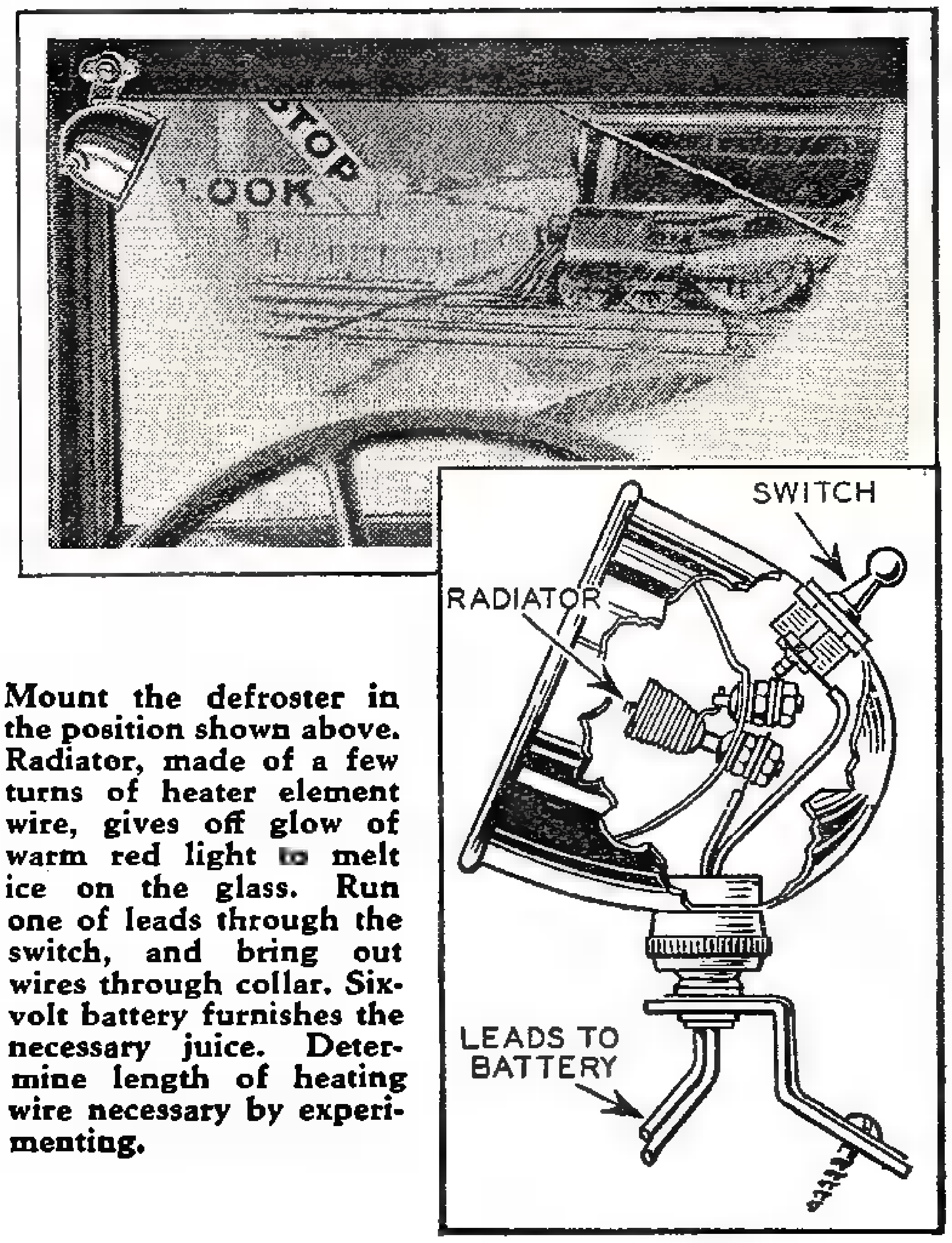
Sewer Pipe Has Leak-proof Joints

THE annoying tendency of sewer pipes to leak, sag, buckle and admit tiny roots has been curbed by a new pipe developed by a Minneapolis water engineer. As the pipe is designed, it has a spigot equipped with a collar which fits tightly into the bell. The joint is made by sliding the spigot through a cut-away section of the bell which afterwards is sealed up tightly, leaving a strong, sagproof joint.

Defroster for Car Windshield

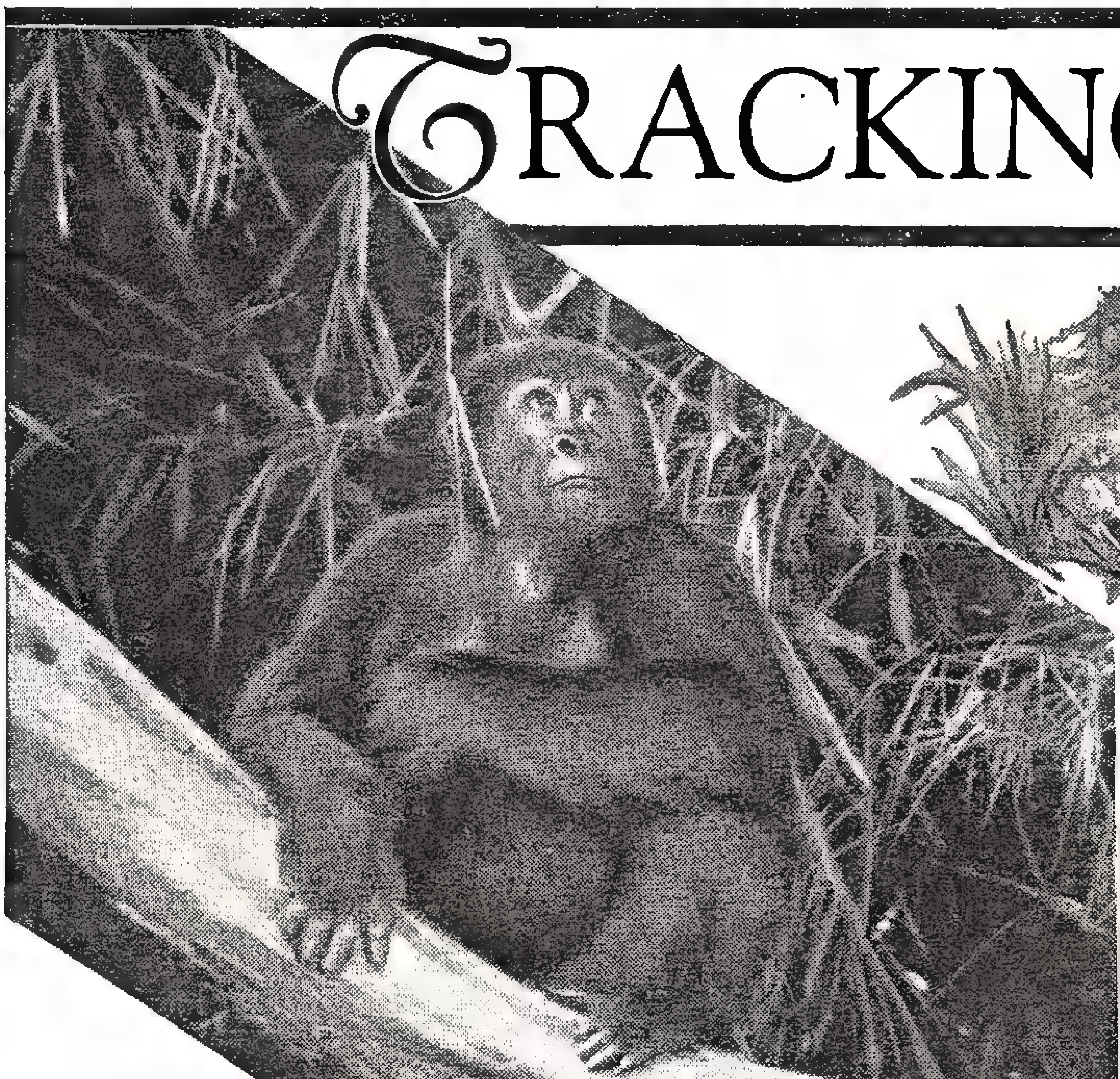
RED rays from this little defroster, which you can easily make, will have a quick way with ice on your windshield. In an ordinary small headlight reflector mount a radiator made of a few turns of heater wire, as illustrated in the drawing. In winding the radiator use just enough heater wire to give a dull red glow when the ends are hooked to a six-volt storage battery. A switch in the top turns on the current, while the entire structure is supported by a bracket in the position illustrated.

Ice collecting on the glass is quickly melted, while the wiper removes the water, permitting you unobstructed vision.



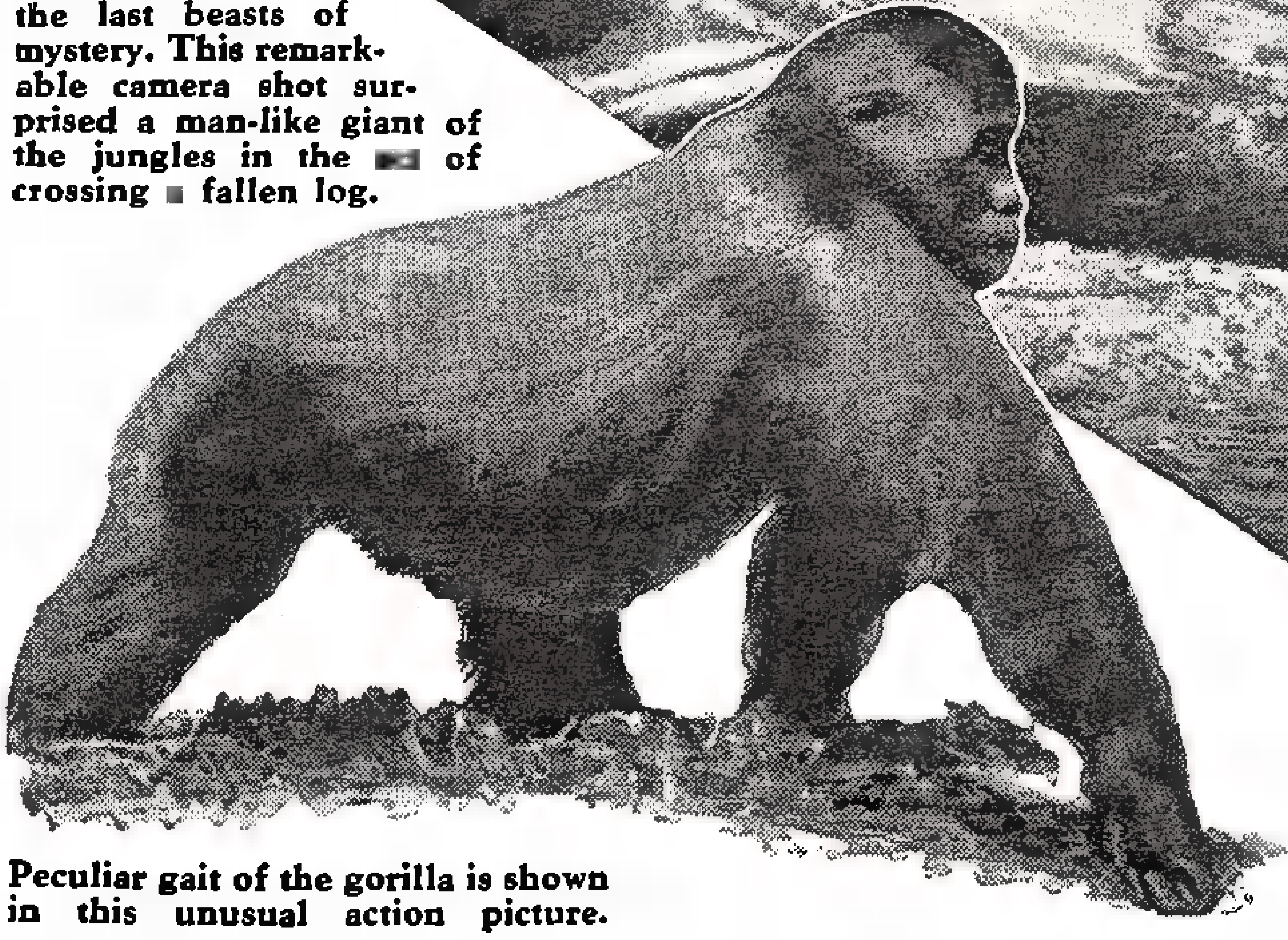
Mount the defroster in the position shown above. Radiator, made of a few turns of heater element wire, gives off glow of warm red light to melt ice on the glass. Run one of leads through the switch, and bring out wires through collar. Six-volt battery furnishes the necessary juice. Determine length of heating wire necessary by experimenting.

TRACKING Down



The mountain gorilla is one of the last beasts of mystery. This remarkable camera shot surprised a man-like giant of the jungles in the act of crossing a fallen log.

Broad back of a gorilla that narrowly missed killing a native guide. Note the massive shoulders. This specimen weighed 380 pounds, mostly muscle.



Peculiar gait of the gorilla is shown in this unusual action picture.

Thrilling experiences on African adventure trail with Dr. Harold C. Bingham, as told

by JAMES NEVIN MILLER

OF ALL the weird yarns told about Africa probably none rival for sheer drama and thrills the recent experiences of Dr. Harold C. Bingham, famous explorer for the Carnegie Institution of Washington and Yale University. For three months Dr. Bingham and his wife, aided only by a handful of native guides and interpreters, lived shoulder to shoulder among the mysterious mountain gorillas that inhabit the northeastern part of the Belgian Congo, a region so densely jungled that for the most part the explorers literally had to chop their way through bamboo thickets almost as big around as the average man's waistline.

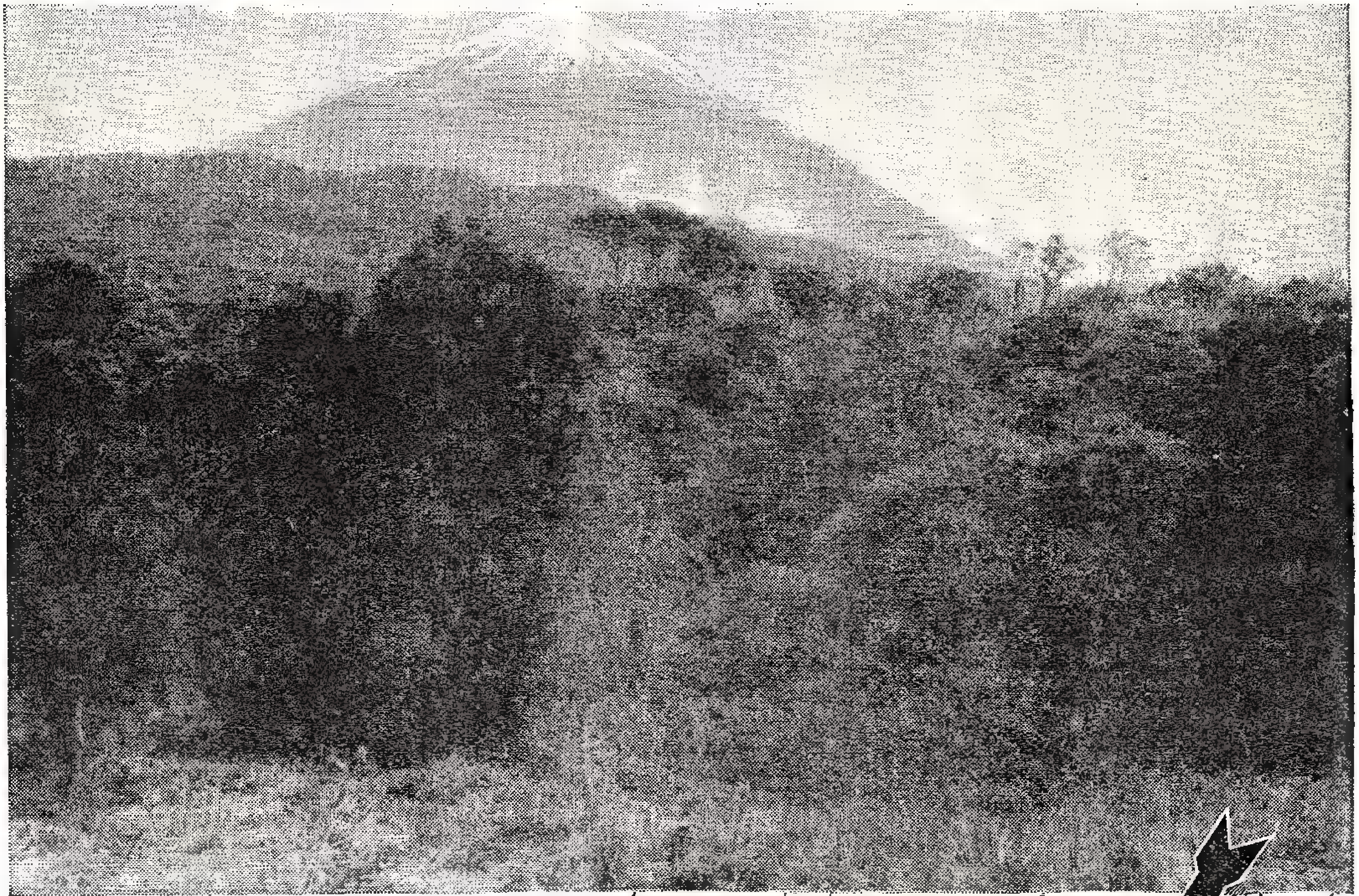
It was this remote section of the globe that gave birth to the many fantastic tales, re-told again and again in fiction and in film, to the effect that giant apes would carry off any white woman that dared invade the region.

Here, too, it was that Carl Akeley, noted naturalist, breathed his last, back in 1926, a prey to the death-dealing jungle fever that has ended the distinguished career of many an investigator of the Dark Continent's cherished secrets.

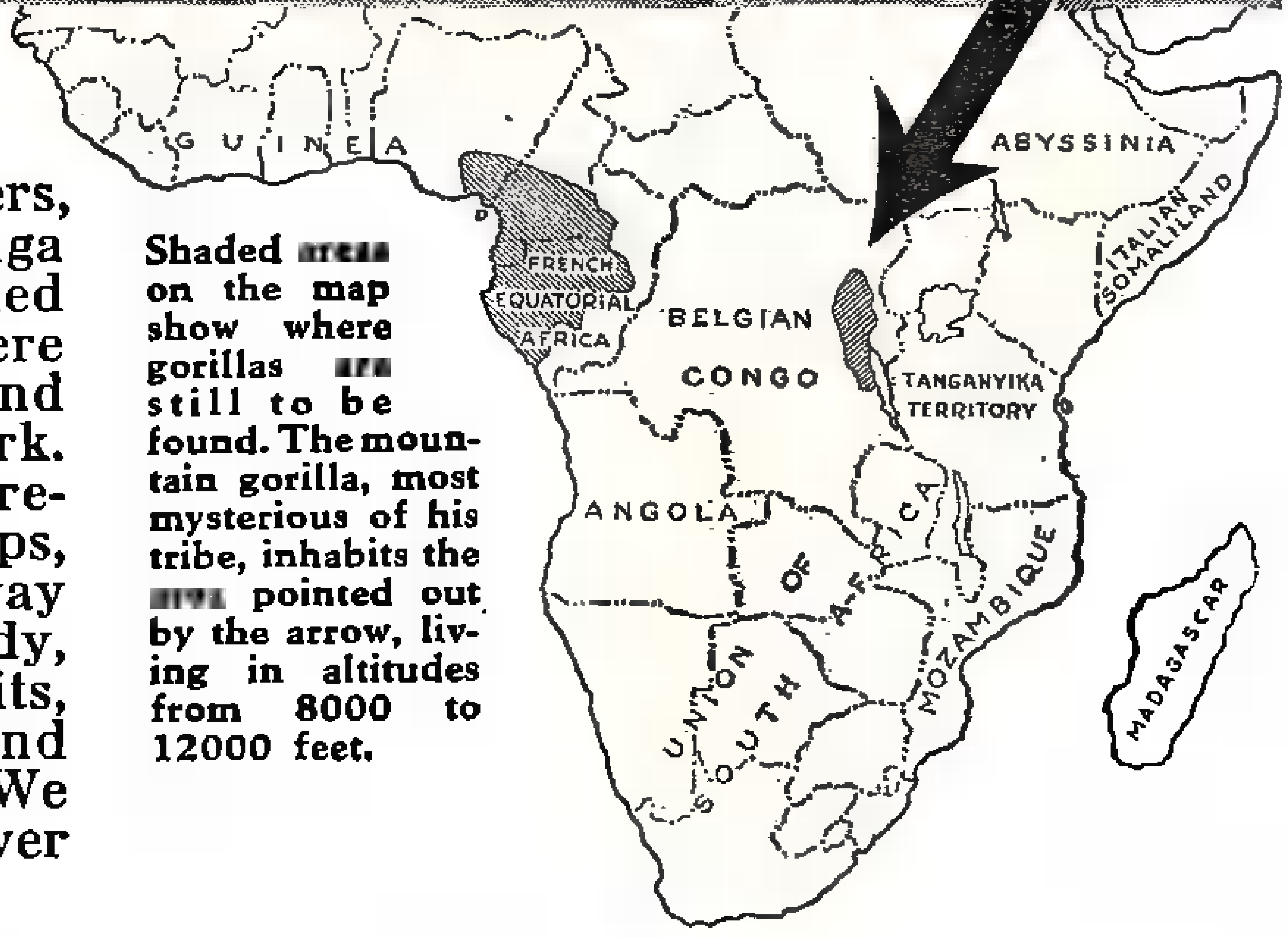
On one occasion during the Bingham exploration, an infuriated charge by a gorilla weighing close to 400 pounds, came within a hair of exterminating Mrs. Bingham and a native guide. But let the daring explorer tell his own story:

"Following the advice of government officials, we made Lulenga the base for our field supplies. Whereupon, my wife and

the Mountain GORILLA



Mt. Karasimbi, home of mystery. In bamboo belt which encircles this volcano, the mountain gorilla is found.



Shaded areas on the map show where gorillas are still to be found. The mountain gorilla, most mysterious of his tribe, inhabits the area pointed out by the arrow, living in altitudes from 8000 to 12000 feet.

myself, with native guides, gun bearers, personal boys and 40 porters, left Lulenga for a three days' climb up the wooded slopes of Mount Mikeno to Kabara where we established our first field camp and remained for our first month of work.

"During this period we were in frequent contact with various gorilla groups, following them as they fed their way along, carefully recording for future study, observations on the nests, feeding habits, social responses, nomadic behavior, and the individual traits of the animals. We took moving and still pictures whenever conditions favored."

Three Paces From Death

Now comes the big thrill of the expedition—the experience with the giant ape which came within a hair of exterminating the explorer's wife and a native guide. Mrs. Bingham takes up the narrative:

"One afternoon we followed a band of gorillas which we had observed and filmed the day before. When they had retreated beyond range of our cameras we packed up all photographic equipment and started for camp. We had not gone far when we heard what sounded like a gorilla on a ridge above us and at our left. The natives said the gorillas were going towards Karasimbi and that we should go towards Mikeno, although the trail had pointed towards Mikeno from the line the animals had left their nests that morning.

"Following the guide's lead down the slope, we made a wide circle from the place where we last heard the gorillas. As we climbed the next ridge the guide paused to look at a freshly-rooted lobelia (a growing plant) and to say something about 'ngagi, ngini' (gorillas again).

"We had gone only a short way through vegetation when a gorilla yelled. The guide stopped, whirled about and fled. Mr. Bingham called for me to come back, which I turned to do, but had taken only a step or two when he commanded 'get out of the way.' I pushed into the wild

So dense is the African mountain jungle that photography is difficult, but the above picture shows two groups of gorillas and one tree nest, pointed out in circles. At right, typical native guide of the expedition.

One of a gorilla band posed for this picture on a fallen tree. Gorillas eat the succulent shoots of bamboo and wild celery. The bands are constantly moving, feeding as they go.

carrots at the left of the trail while he ran forward and fired. The animal had come within 15 feet of the place where Mr. Bingham stood when he fired. The gorilla turned about and fell in the trail some 40 paces distant."

Dr. Bingham goes on to point out that during the charge of the infuriated animal, Mrs. Bingham hadn't the faintest notion as to just how close a call she had with death. The charging gorilla was shot within three paces of where she stood, yet for some reason or other, possibly because of the dense underbrush, or perhaps because the beast was chasing the guide, it paid no attention to her. As always, she was armed with a pistol, but probably wouldn't have been able to use it in time to avert either serious injury or death, had the gorilla chosen to charge her.

During their three months' jungle trip, Dr. and Mrs. Bingham made a painstaking study of the giant ape's habits. First of all they discovered that a belt of forest growth of varying width, in which the bamboo predominates, encircles the central mass of the three great volcanoes of the Kivu region—Mikeno, Karasimbi and Visoke—at altitudes from about 7,500 to 10,000 feet. In places it is so dense that it is impossible to penetrate except by cutting trails.

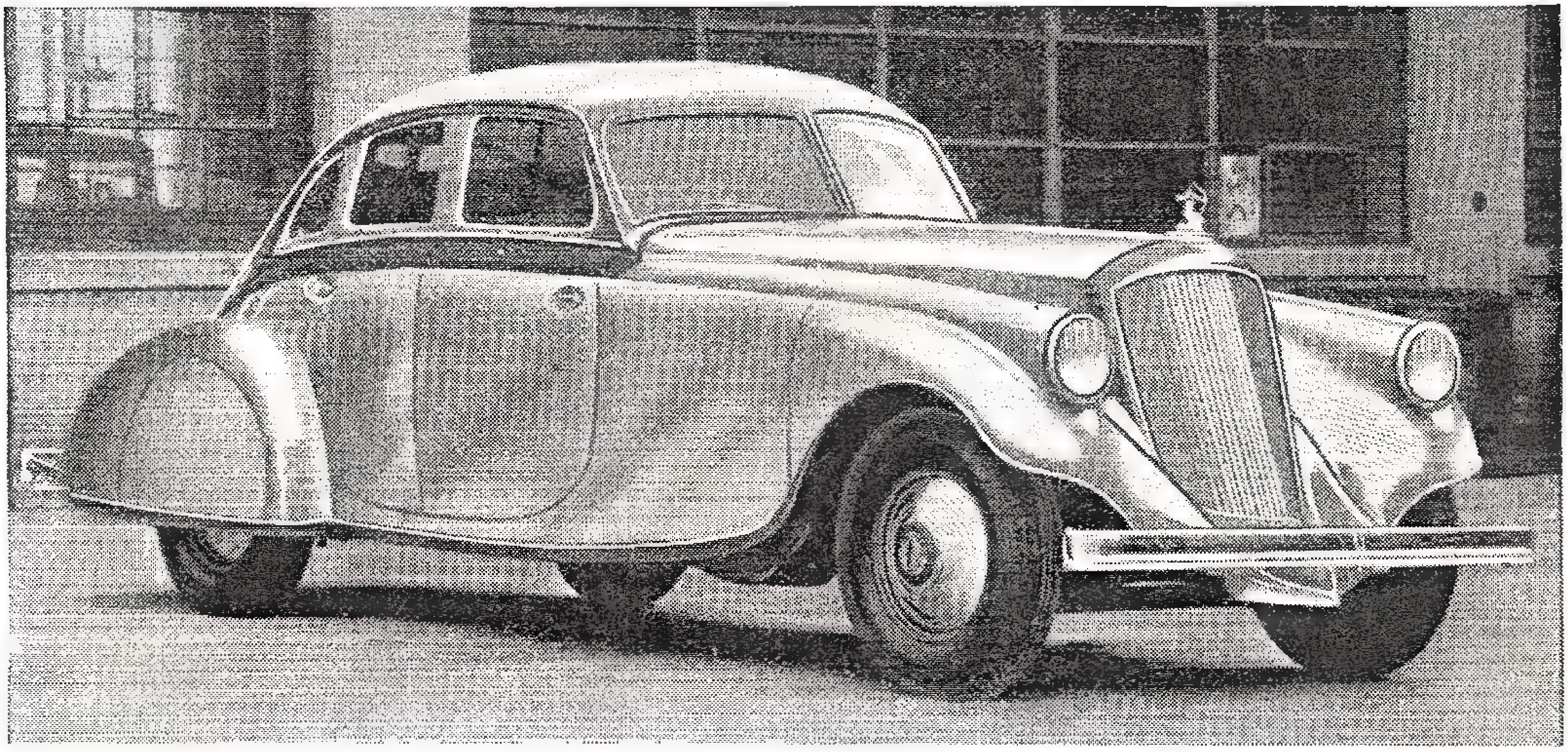
The succulent shoots, or "suckers," which the bamboo roots send through the soil into the air above constitute an important item in the gorilla's bill of fare. The young and tender shoots are eaten entire; the older and tougher stalks are torn open and only the inner portion selected.

Habits of the Gorilla

For nearly a month the observational work of the expedition was carried on in altitudes above the bamboo belt. A similar period was later devoted to exploration from three different field camps on the slopes of Mikeno in and below the bamboo belt. At these lower altitudes the Binghams found tree nests of the gorillas sometimes as high as 50 feet above the ground; and, east and west of Berunga, a number of old nests made by chimpanzees. Both above and below the giant bamboos they found gorillas and trailed various bands for distances varying from one to three

(Continued on page 139)

1933 *Brings* NEW *Streamlined* AUTOS



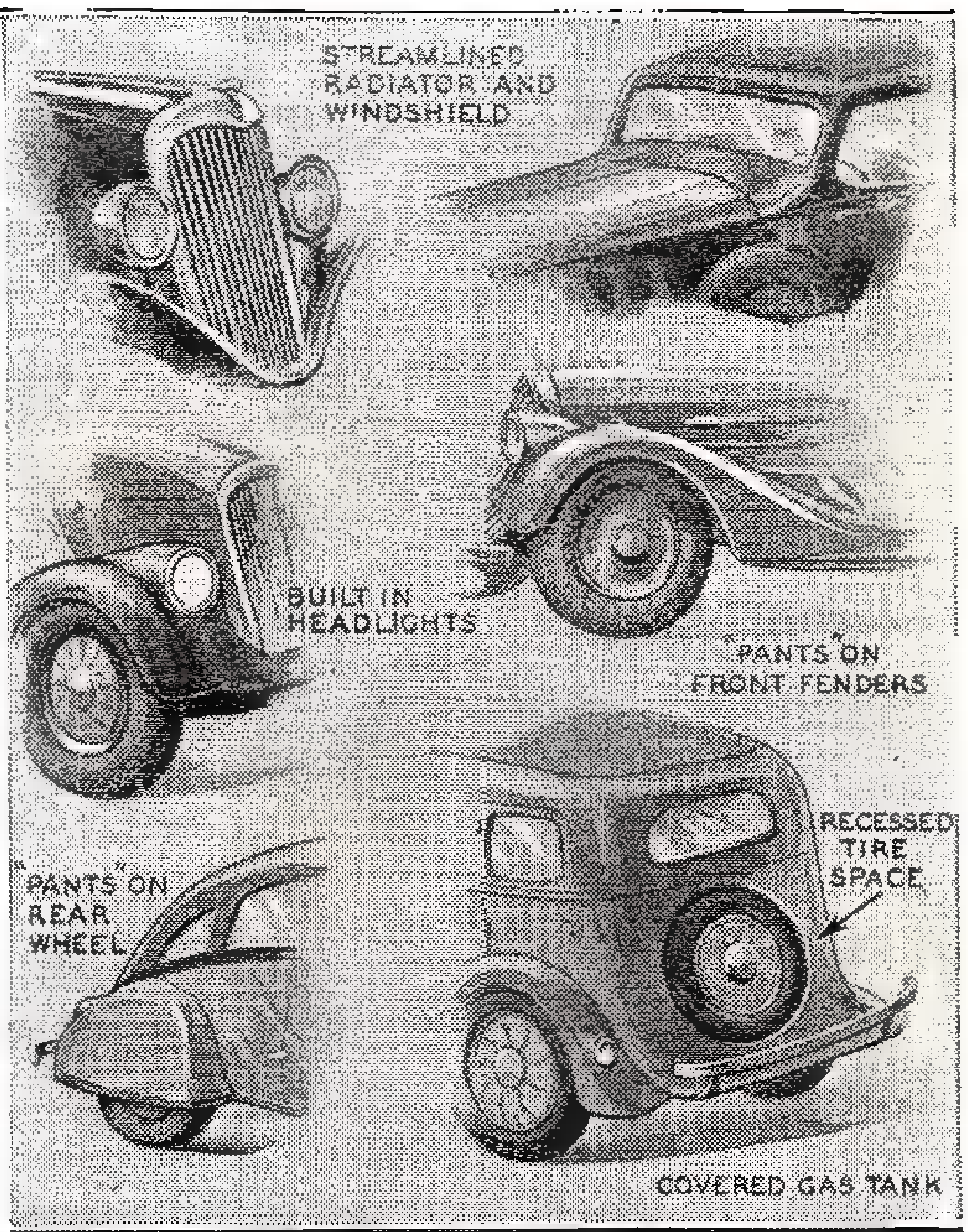
Pierce Arrow's "Silver Arrow," five of which have been built for sale at $10,000 each, is the most advanced streamline car of American manufacture, produced after extensive wind tunnel tests. Note absence of projecting body parts.

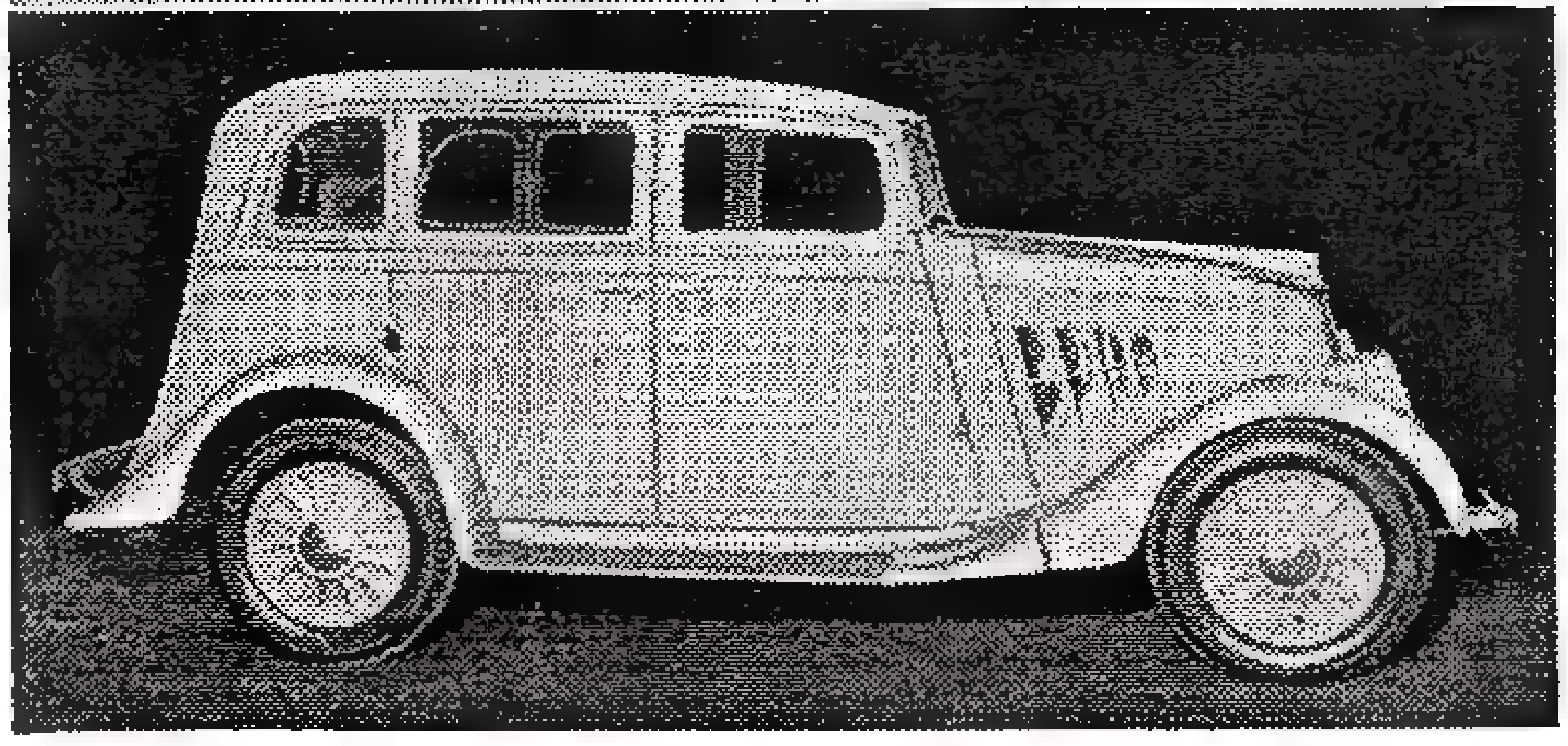
FOR the past couple of years automobile manufacturers have been cautiously adding minor streamlined features to their cars to see how the innovations would "take" with the public. This year's shows disclose the fact that streamlining has captured public favor, distinguishing features common to practically all 1933 models being the use of V-type slanted radiators, sloping windshields, front fenders which sweep down to the bumper line, sloping rear quarters which completely cover the gas tank, and both front and rear fenders filled in at the "corners" to conform closely to the arc of the wheel.

Both the high and low price brackets in the industry, as well as intermediate cost machines, have been touched by this radical change in body design. Pierce Arrow, with a $10,000 car shown at the top of the page, has turned out the most completely streamlined model produced to date. Rear wheels are enclosed, rear body lines sweep downward from the turret-like superstructure, and even the door handles are recessed to afford as little obstruction to the wind as possible.

Willys, at the other end of the price scale, has brought out a car which embodies most of the general innovations described above, and which in addition has enclosed the spokes of the wheels in a removable disk, as well as incorporating the feature of building the lights into the sweep of the fenders.

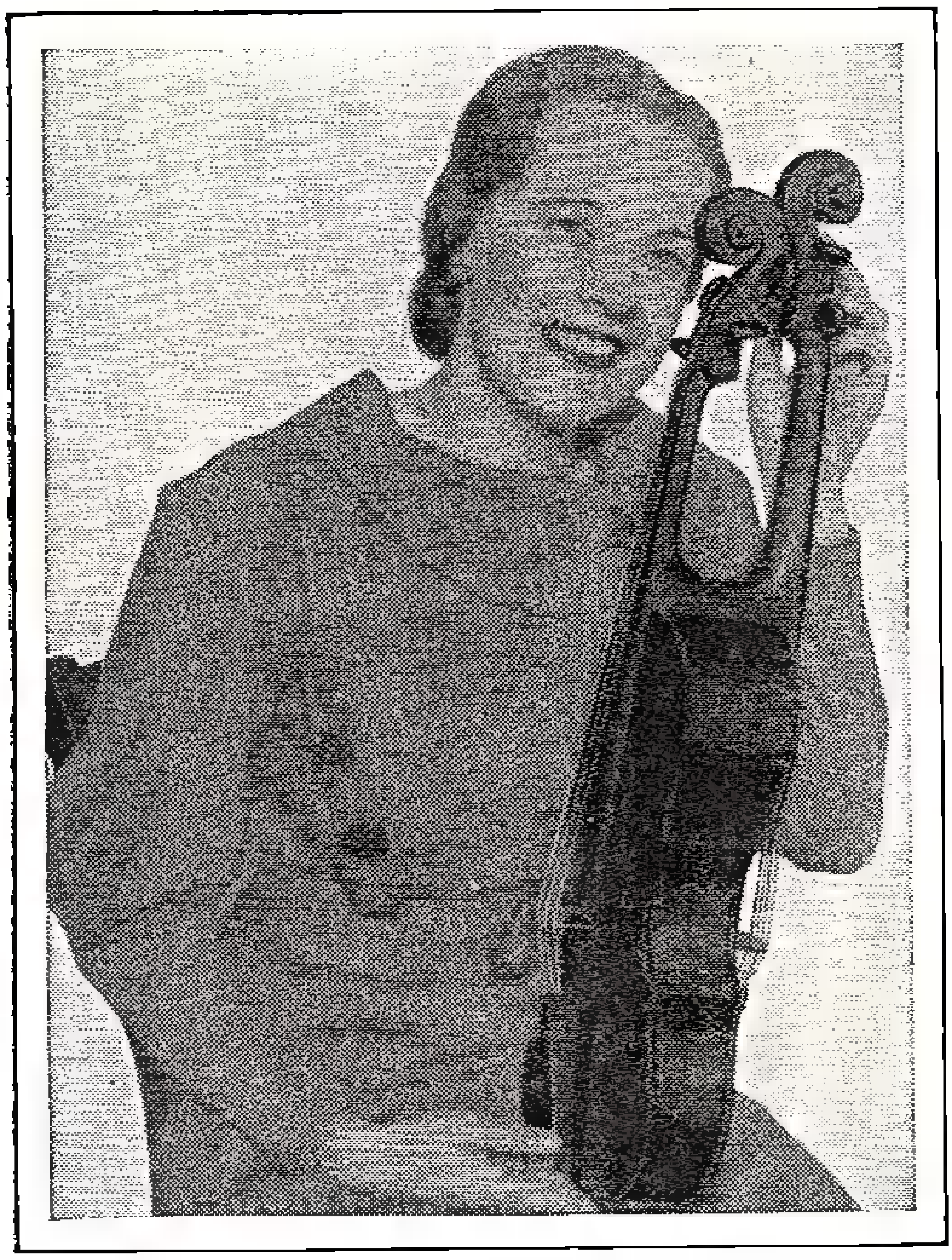
Modern automobiles would be better streamlined if they ran backwards. To achieve the perfect streamline, motor car engines will probably be placed over the rear axle of the car.





The Willys car shown above is a new model which brings advanced streamlining to the low price field. Sales emphasis of 1933 cars has been on body design, where last year free-wheeling was played up. Modified streamline features typical of 1933 models are shown in the drawings above. The new designs, it is claimed, reduce fuel consumption.

Twin Violin Has Double Tone Scale, Plays Also as Viola



Here's new "Siamese Twin" violin which has double tone scale, one the same as an ordinary violin, the other a base range like a viola. It is utilized in large orchestra work.

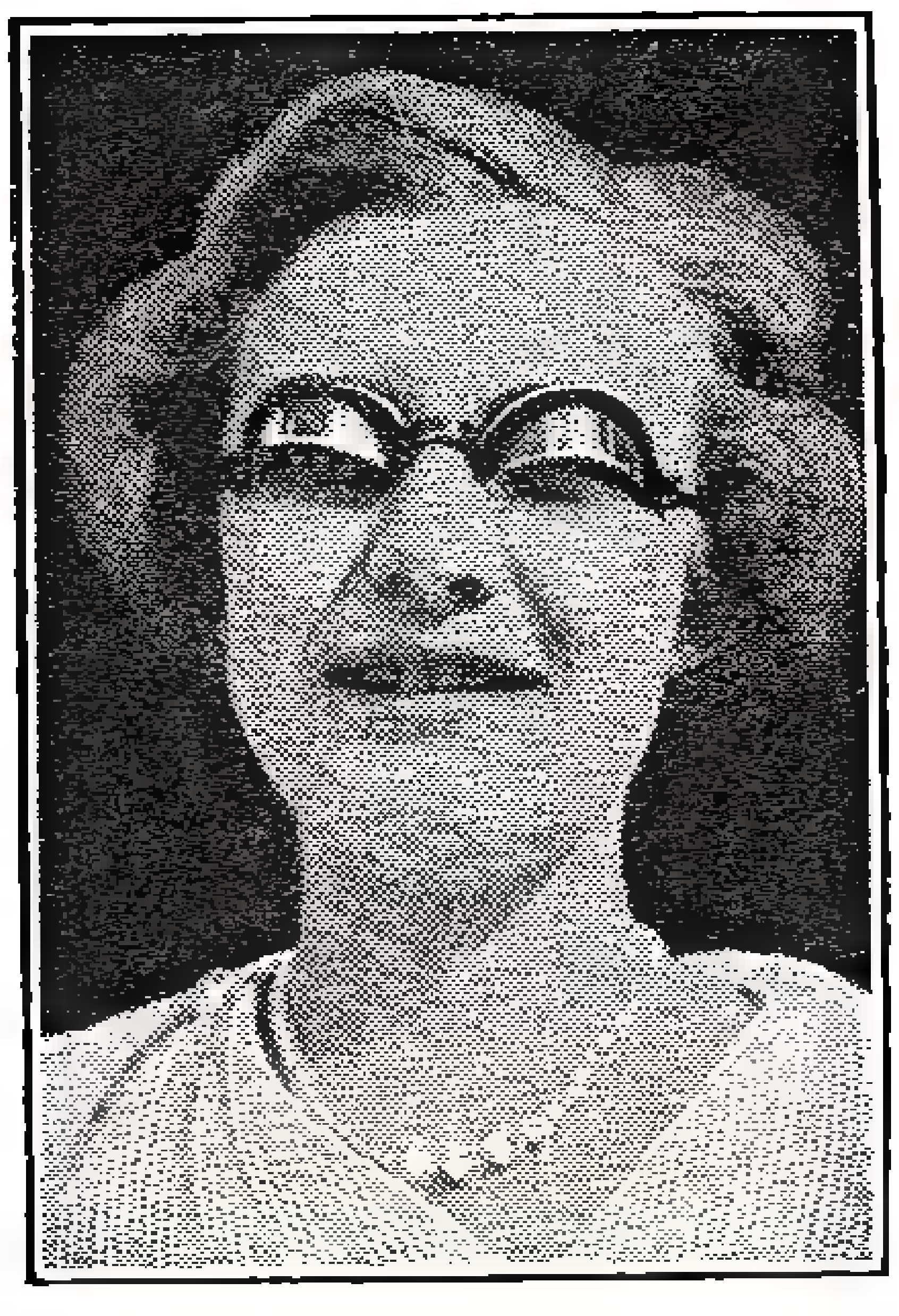
A VIOLIN having a double range of tone and resembling in appearance that of the "Siamese twins" was one of the notable inventions exhibited recently at the National Inventor's Congress.

This violin, which may be seen in the photo at the left, has a double tone scale, one the same as an ordinary violin, and the other a base range like that of the viola. It is utilized for large orchestra work, and is said to be a great advance in the string instrument field. The inventor is John Faccare of St. Louis, Mo.

Blood Transfusion From Corpse

BLOOD transfusion from dead bodies to living ones, so that the blood of people who die in hospitals can be saved to aid later patients who need it, is a revolutionary procedure perfected at the Institute for Blood Investigation at Moscow, Russia. The chief advantage of using corpse blood is said to be that much larger amounts can be obtained quickly, much more than can be drawn safely from a living donor.

Non-glare Eye Shades for Motorists



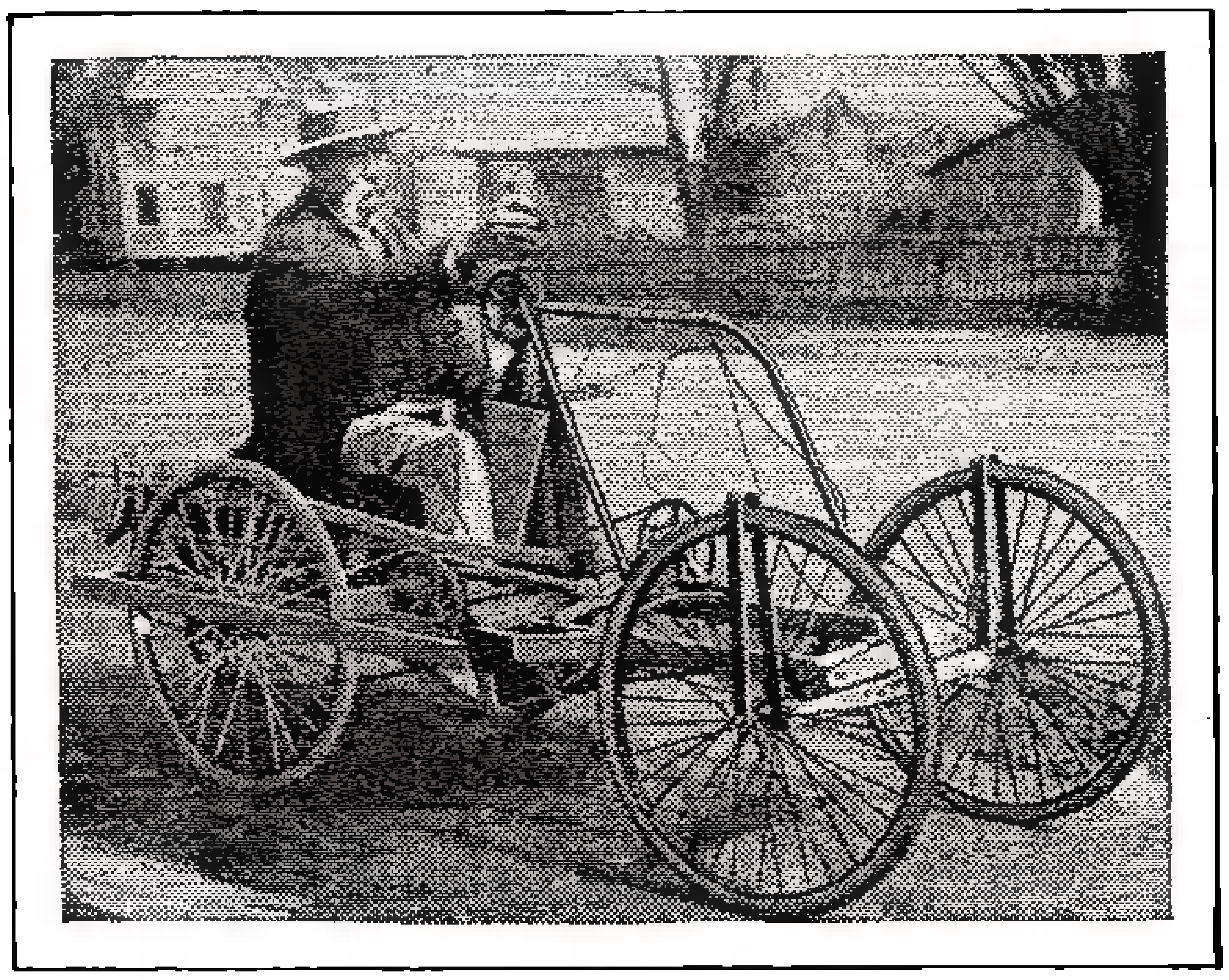
Shades covering upper part of eye prevent blinding motorist.

PROVIDING full protection from excessive glare while at the same time permitting full normal vision, the latest non-glare eye shades are a boon to motorists. This invention comprises individual eye shades mounted in a spectacle frame and providing full protection against excessive glare such as sunlight and the headlights of an approaching car in night driving.

Unique Runabout for Cripple

ALL honors for uniqueness in vehicles goes to the contraption seen in the photo below. It's not so hot on speed, since its motor is nothing more than muscle power of the rider, but it gets there just the same. The chassis is simply a wooden framework, while the wheels are what was left of a bike after the frame was removed.

The builder of this particular contraption, who is a cripple, may be seen operating his vehicle. He simply turns a crank and the power is transmitted by chain to a sprocket under the chassis. Another sprocket transmits the power to the rear wheel.



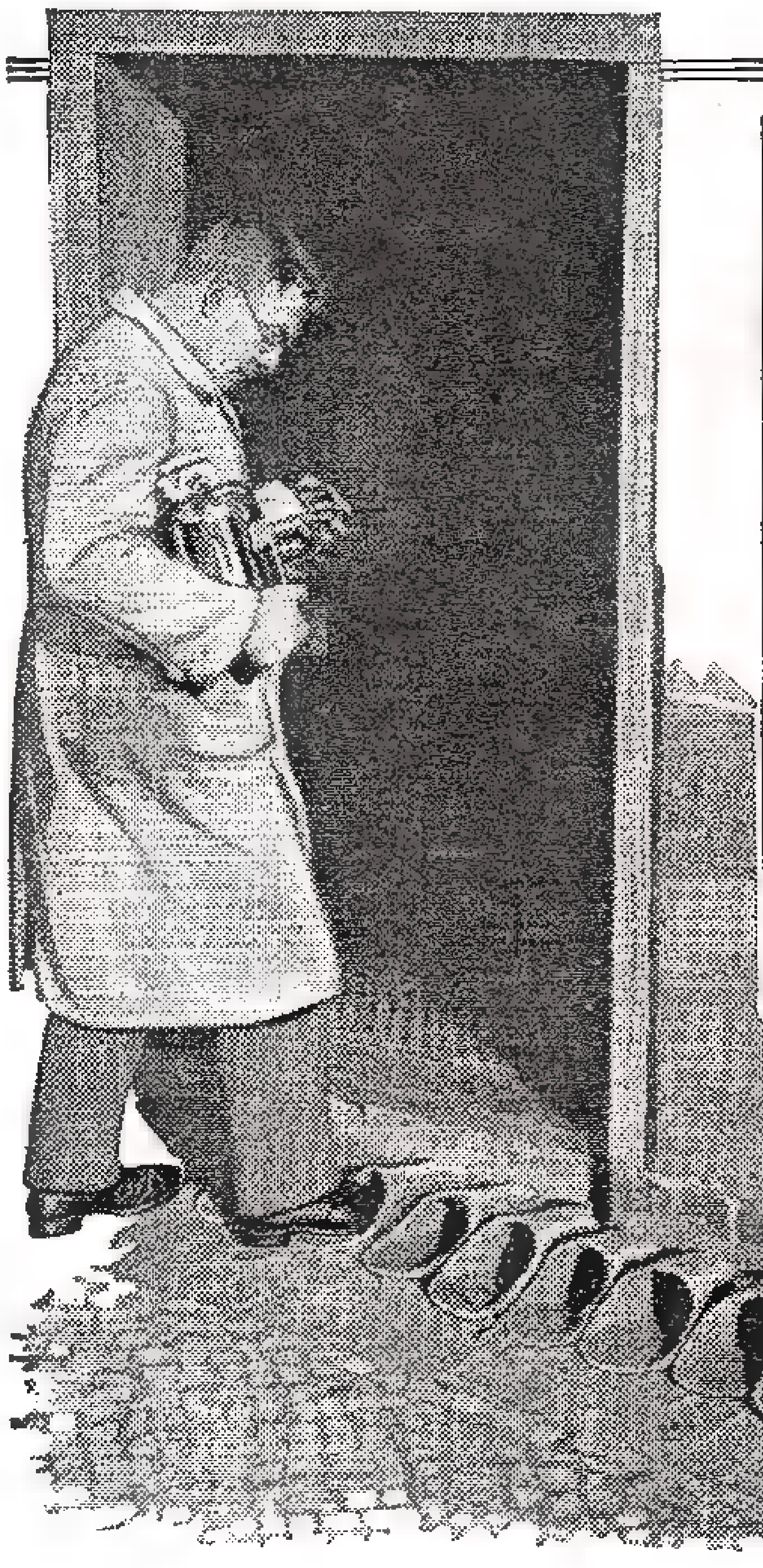
This vehicle was formerly a couple of bicycles. Now, however, it is a crippled man's chief means of conveyance.

When Do People Get Grey Hair?

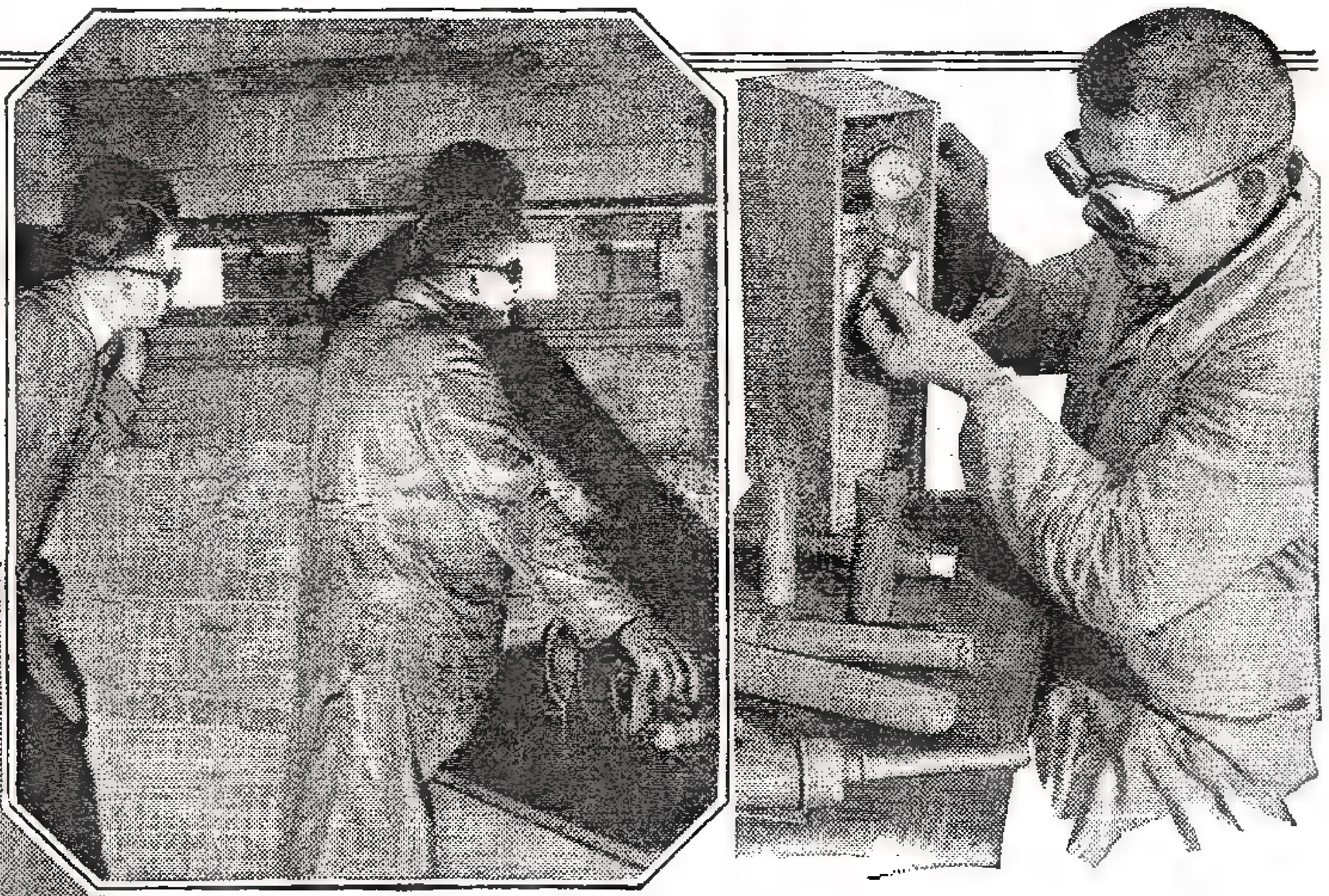
ANY white person over thirty-five years of age is a candidate for the first grey hairs, according to averages recently determined by scientists. A white person as much as 44 years old is reasonably sure to have the first grey hairs.

There usually is a considerable darkening of a white person's hair between birth and about 26 years of age, after which the darkening is slower until the age when greying begins. Persons whose hair darkens rapidly in youth also are likely, it is found, to get grey at earlier ages than those whose hair darkens more slowly.

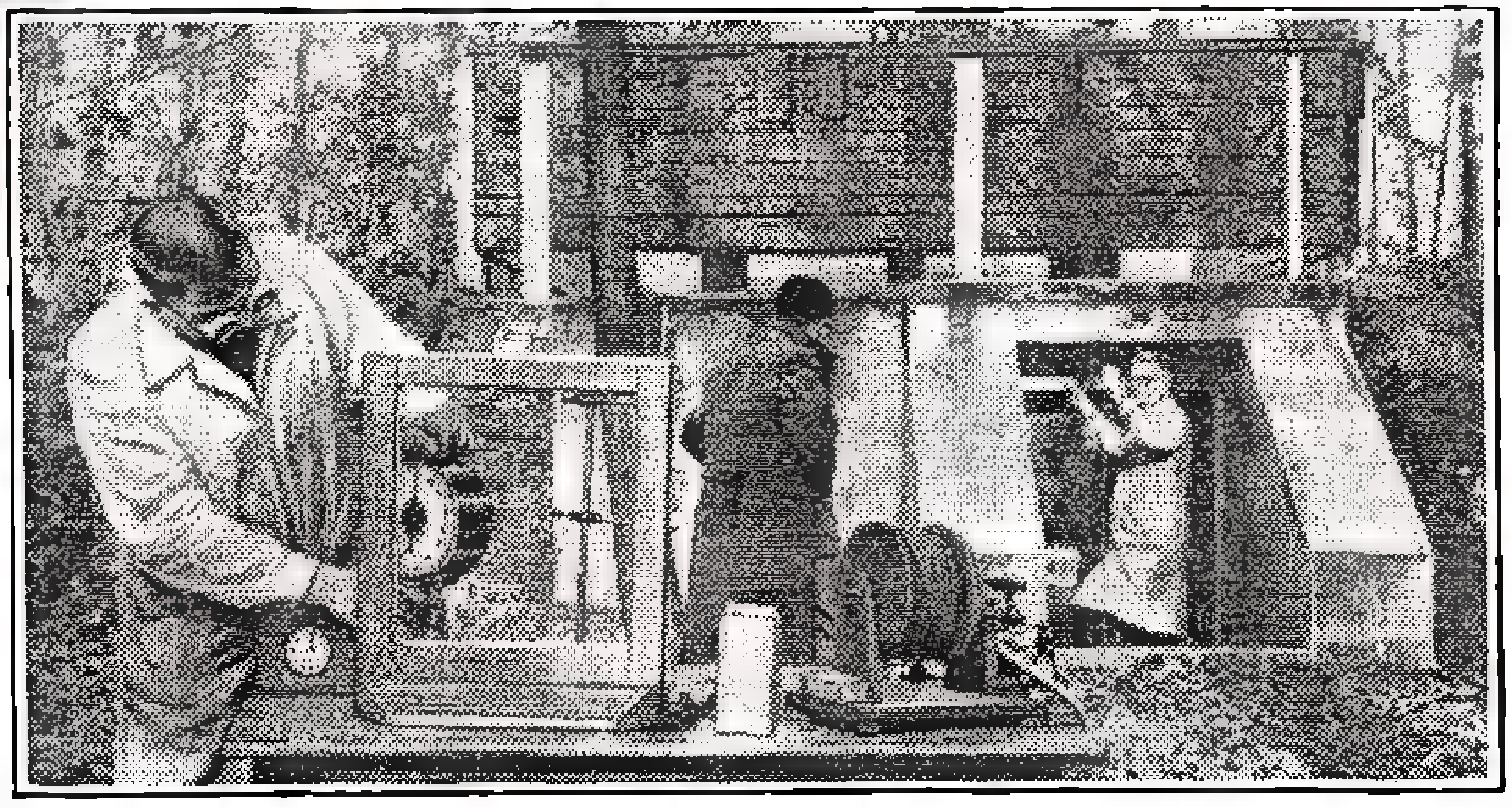
Scientific Explosions Give Clue to Bombers



Technicians entering the laboratories to analyze bombs first don a pair of felt slippers to prevent possible explosion caused by static from friction of leather soles or shoe tacks.



At left are seen scientists watching explosion after setting off bombs from dugout. Right—Collection of time and other bombs assembled for analytical inspection by technicians of Berlin Police Department.



Bombs collected for study by Berlin police are detonated harmlessly in this explosion pit. Analysis of remains shows construction of bomb and tells the amount of damage the bomb would do if given a chance.

POLITICAL disorders throughout the world, particularly in Germany, have put scientists on their mettle to devise methods of preventing bombing outrages, either by ferreting out the bomber or preventing the explosion of the deadly instruments.

The technical department of the Berlin police force has set up a laboratory for the study of bombs which have been planted or exploded by Communists, Hitlerites and other disgruntled political fanatics. From the data gathered in analytical inspections the police are enabled to apprehend the bomber, much as ballistics experts in United States get evidence on a criminal from bullet fired from his gun.

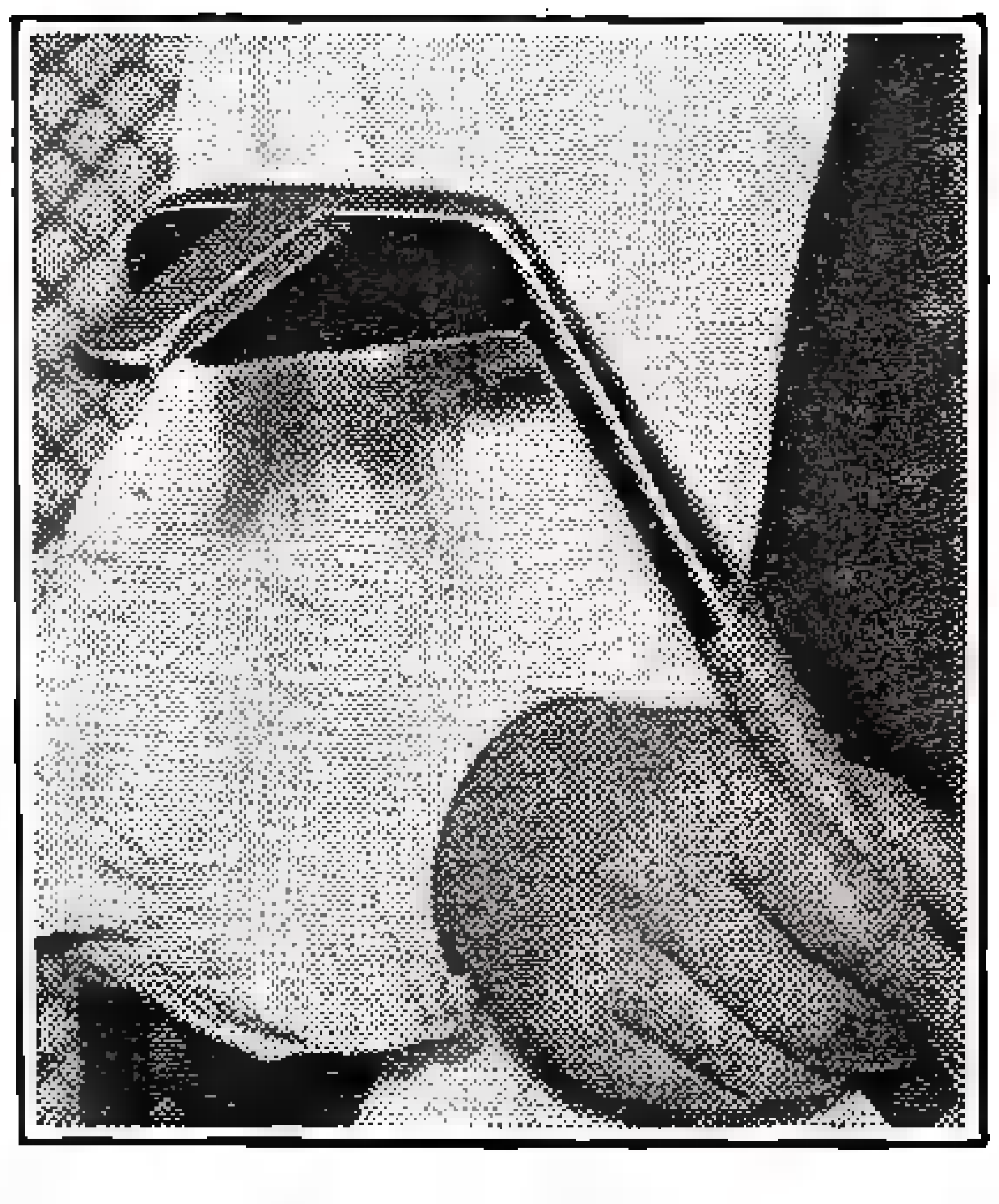
A feature of the Berlin bomb laboratories is an explosion pit where the missles are fired without danger. From a pill-box-like concrete house near by the technicians set off the bombs, watching the results through narrow slits and learning the force of the explosion from a special set of meters.

After the detonation remains of the bomb are collected and analyzed with a view to discovering how much damage it could do.

In another section of the laboratory the bombs are disassembled for a study of their mechanism. Work on the missles is naturally exceedingly dangerous, and to prevent possible explosions caused by static electricity the technicians wear felt slippers.

New Golf Club Aids in Putting

GOLFERS in their battle with par will be aided by a new club which has been designed to relieve their tribulations. Shown below, the club is featured by a flange about ¾ inch wide and 2⅝ inches long projecting horizontally from the exact center of the back heel of the blade. If the putting stroke is not properly made, flange strikes the ground, indicating that the player must have allowed his wrists to sag too much.



Flange on putter shown above strikes ground if stroke is not properly made by the golfer.

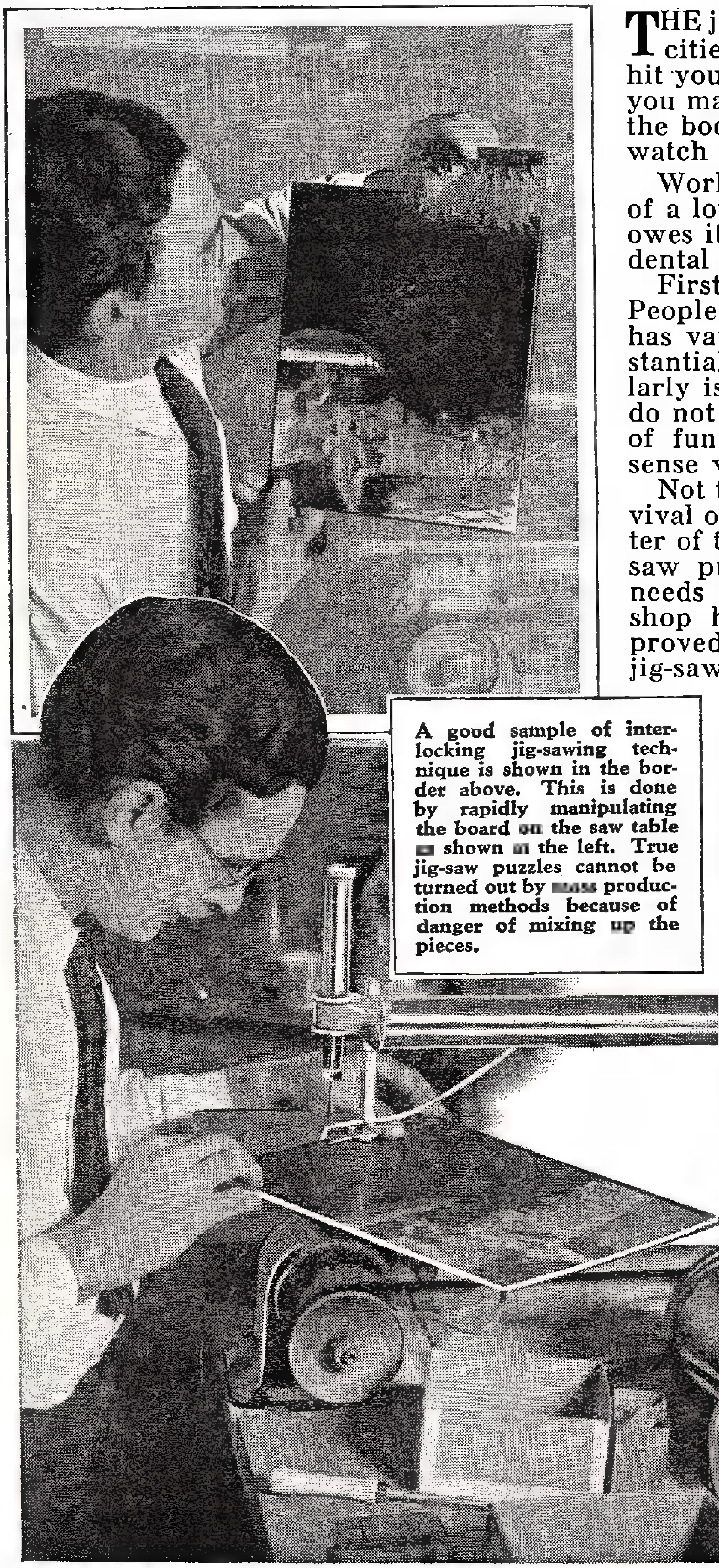
JIG-SAW

THE jig-saw puzzle craze has hit the larger cities and towns with a bang. If it hasn't hit your community yet, it will, and while you may be a scoffer today, the fever, like the boogey man, will get you if you don't watch out.

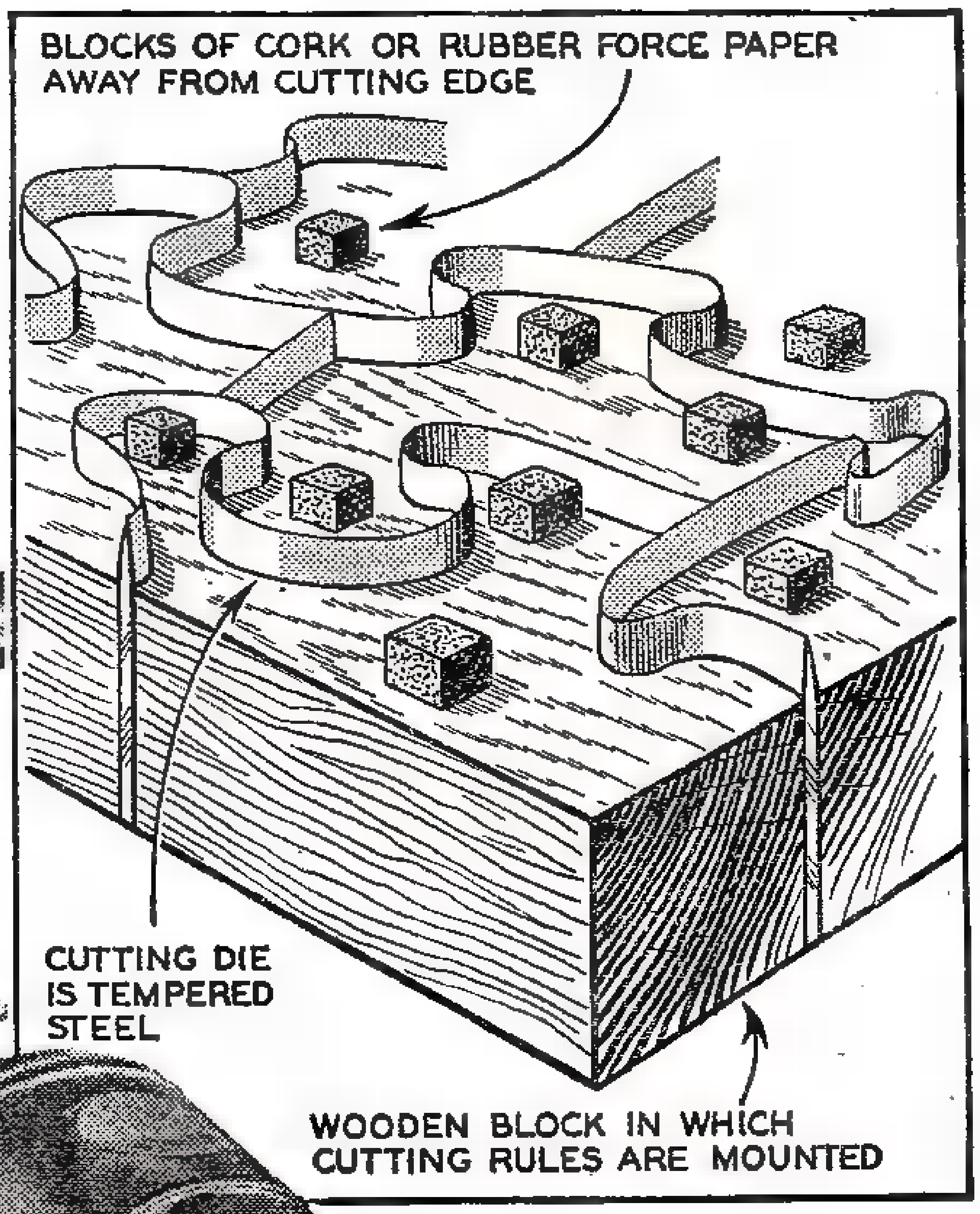
Working a good jig-saw puzzle is a whale of a lot of fun. Psychologically the vogue owes its popularity to a number of coincidental circumstances.

First there is the matter of the depression. People are "sick of it all." The old order has vanished, and the simpler, more substantial pleasures are welcomed. Particularly is this true of jig-saw puzzles which do not cost much, and yet which are a lot of fun because they satisfy the creative sense which is inherent in each of us.

Not the least important factor in this revival of an old nursery pastime is the matter of tools used in the manufacture of jig-saw puzzles. Companies catering to the needs of the man who has a home workshop have brought out a variety of improved machines ranging from elaborate jig-saws costing hundreds of dollars down



A good sample of interlocking jig-sawing technique is shown in the border above. This is done by rapidly manipulating the board on the saw table as shown at the left. True jig-saw puzzles cannot be turned out by mass production methods because of danger of mixing up the pieces.


BLOCKS OF CORK OR RUBBER FORCE PAPER AWAY FROM CUTTING EDGE
CUTTING DIE IS TEMPERED STEEL
WOODEN BLOCK IN WHICH CUTTING RULES ARE MOUNTED

Above you will see the method by which the cardboard type of jig puzzle (often miscalled jig-saw puzzle) is made. The pieces are large and cannot be made as intricate or small as wooden puzzles that are actually sawn out. A thick block is sawn in pattern, the rule laid in, and small corks spotted to eject the paper after cutting.

CRAZY

How Jig-Saw Puzzles are made and what makes you like them

to small units selling for slightly more than a dollar. No depression in this business!

One of the recent innovations was a very aptly conceived jig-saw that allowed the blade to travel in an absolutely vertical line. This saw was capable of the finest work, and rental libraries took advantage of the need for increased revenue by renting out elaborate puzzles which could be so beautifully cut with this new saw. Shortly the craze spread. It struck a fundamental chord everywhere. And where it hasn't yet struck, there is a vein of gold to be worked by the enterprising man with home equipment of this nature.

How Jig-Saw Puzzles Are Made

The jig-saw puzzle is simply a picture mounted on ⅛" plywood board which is sawed into intricate shapes. Each piece naturally fits the other, and when they are all separated, the reassembly is often very difficult. It is always engrossing.

The picture is mounted on the thin wood panel, and hot glued to the surface by brushing out the bulges with a stiff brush.

As the plywood will warp, it is best to allow the wood and glue to dry under weights. Then the sawing will be easier.

When the puzzle has dried, it is trimmed in a bandsaw or other fine saw to within one-eighth inch of the final border. On a sanding disc the edges are brought to a smooth, square trim.

Then the jig sawing is the next step in manufacture. With a large puzzle the thing is sawed in interlocking curliques along the border. As the strips are sawed off, they in turn are sawed into small interlocking pieces. By shellacking the back of the puzzle the fine blade of the jig-saw will not splinter the wood, and no extra sanding is required, which is quite an item when it is considered that the puzzle may contain from fifty to five hundred pieces or more.

Making Money Is Easy

There are several plans by which the home workshop puzzle fan may make money with a jig-saw.

One of these is the rental system, which followed the original or outright sale idea. It costs commercially about a cent a cut to turn one of these out, and a five hundred piece puzzle usually retails at around $7.00. In renting through rental libraries, 25c to 50c a day (according to size) will soon return the cost of the puzzle. The usual agreement with the library is to rent puzzles on a fifty-fifty basis.

New forms of the picture puzzle are con-

The picture is brushed out flat with a very stiff brush in this manner.

After gluing, the picture boards are weighted down with a castiron slab or other heavy object. This prevents warp. When dry, the board is ready to be put through the jig-saw under the manipulation of a skilled operator.

stantly being introduced. There is the cardboard puzzle, which is a cheap imitation of the more expensive interlocking wooden article. A real wooden puzzle can be picked up like a piece of beefsteak if it is carefully sawn, and will stay together while being assembled.

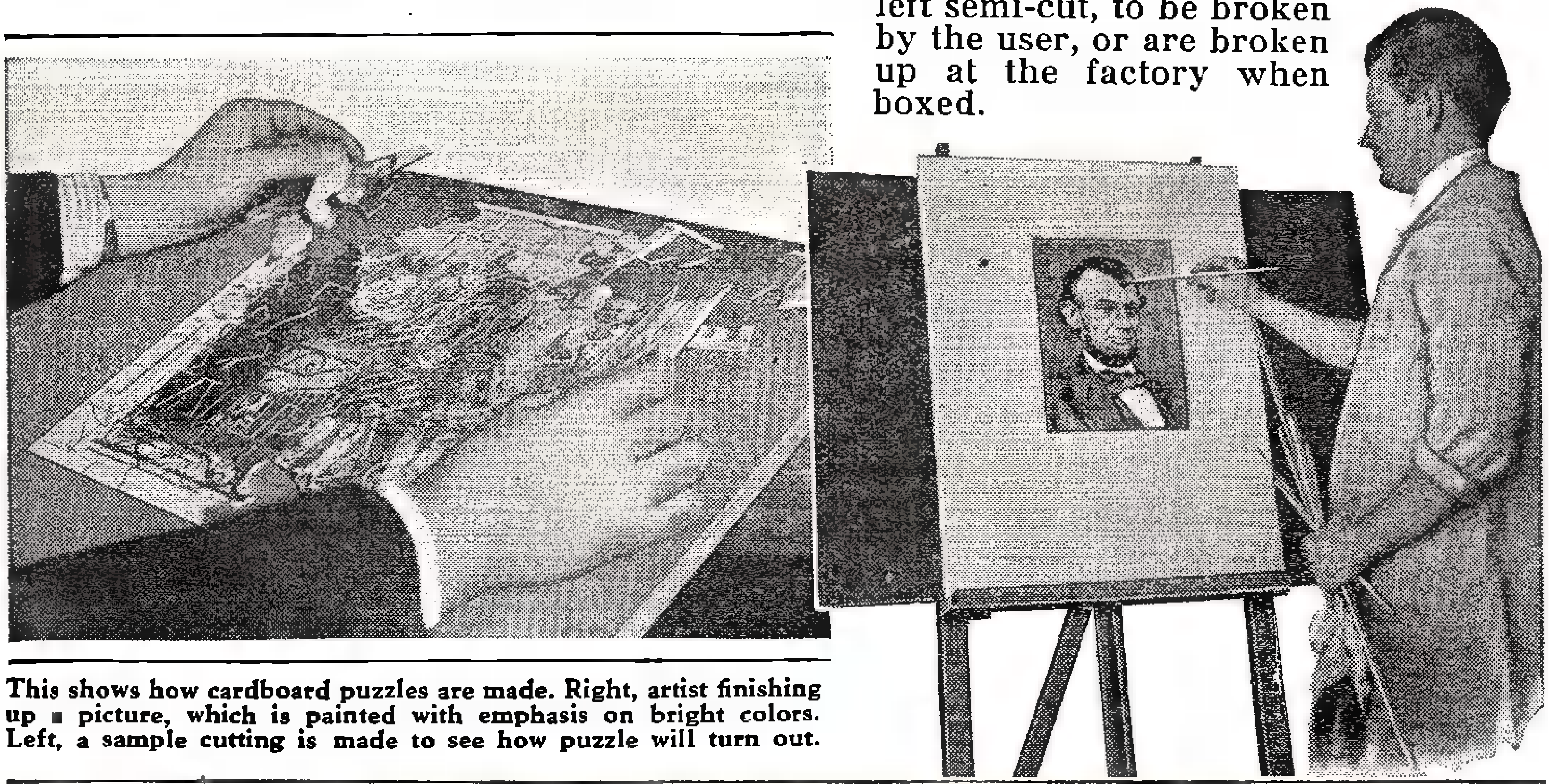
The addition of figures such as ships, owls, birds, houses and so on in the puzzle makes a very fine addition to the matter of arousing and maintaining interest during assembly and this is the one best way to make your puzzles distinctive.

Being sawed out with a .010 inch thick blade the space between the pieces is very small and the picture, when finally completed, makes one feel as though he had painted it himself, for the assembly is done quite as slowly, and the saw cuts in a good puzzle are not too visible.

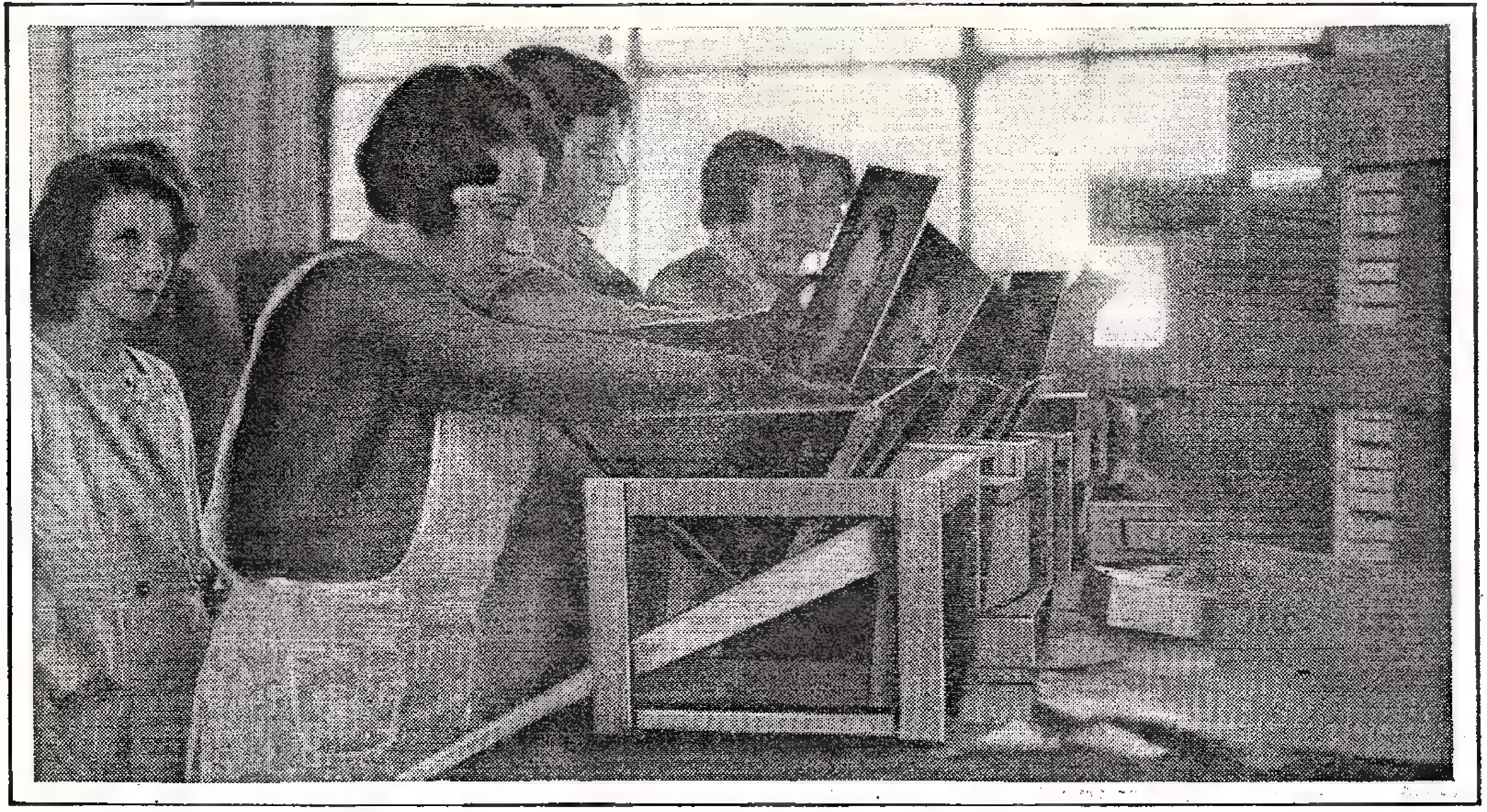
While the wooden jig-saw puzzles are far and away the most fun to work, there have been put on the market a number of paper puzzles which sell at newsstands, and which make their appearance weekly in new subjects.

These paper puzzles are stamped out by steel dies which, because the steel cannot be too sharply bent, cut the puzzles in rather large pieces and with but little interlocking effect.

The drawing shows how such a steel die is made. The pattern is sawn in thick wood, and steel tape run into the saw cut. It is then sharpened and put in a punch press. The puzzles are stamped out and either left semi-cut, to be broken by the user, or are broken up at the factory when boxed.



This shows how cardboard puzzles are made. Right, artist finishing up a picture, which is painted with emphasis on bright colors. Left, a sample cutting is made to see how puzzle will turn out.

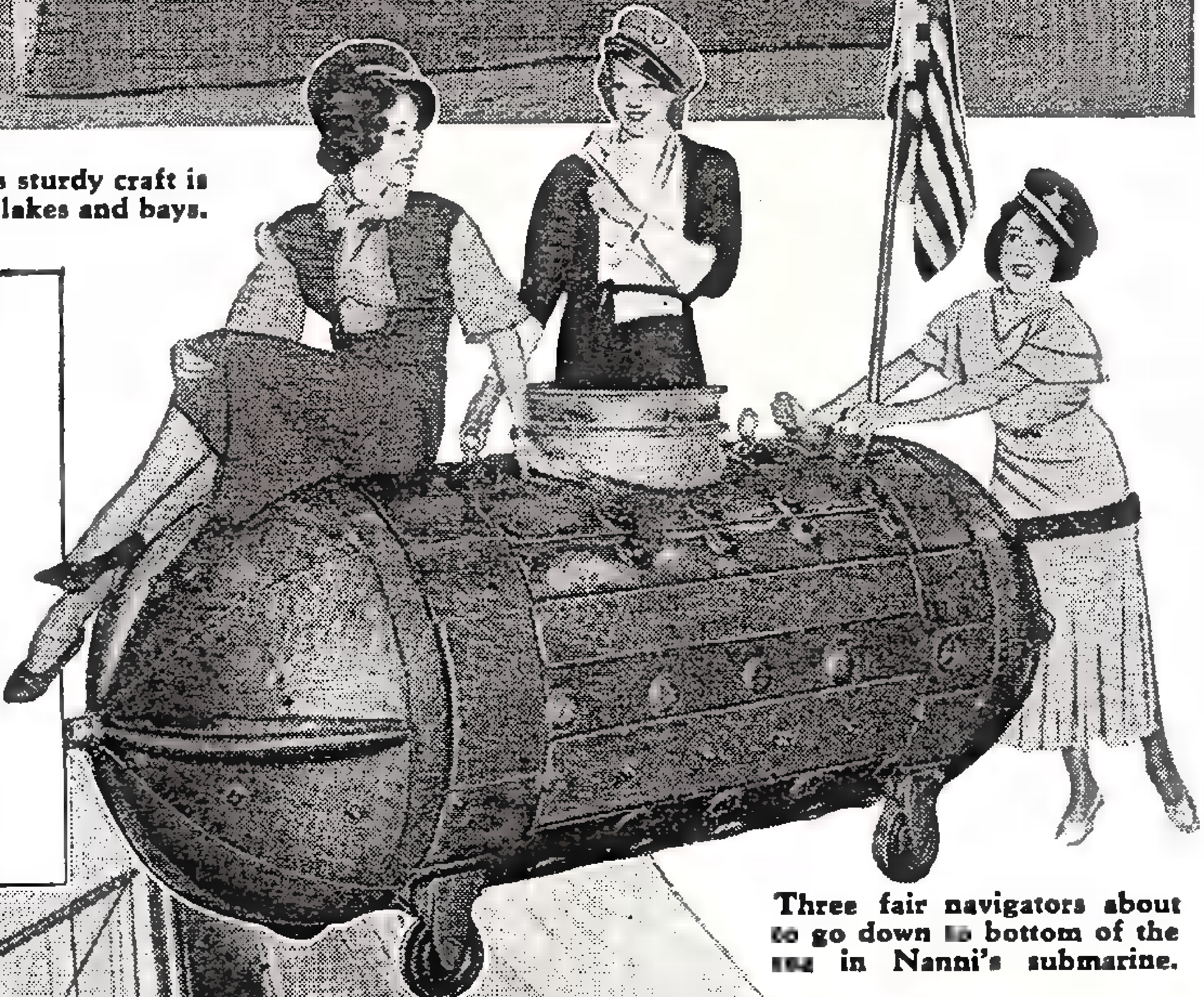


After the paper puzzles are cut from dies they are broken up by girls who dump them into chutes. These chutes empty into the boxes which the puzzles are shipped in. Extreme care must be used to avoid losing any of the pieces.

Unique Craft Intrigue BOATING Fans

Powered by electric motor this sturdy craft is ideal for lazy cruising around lakes and bays.

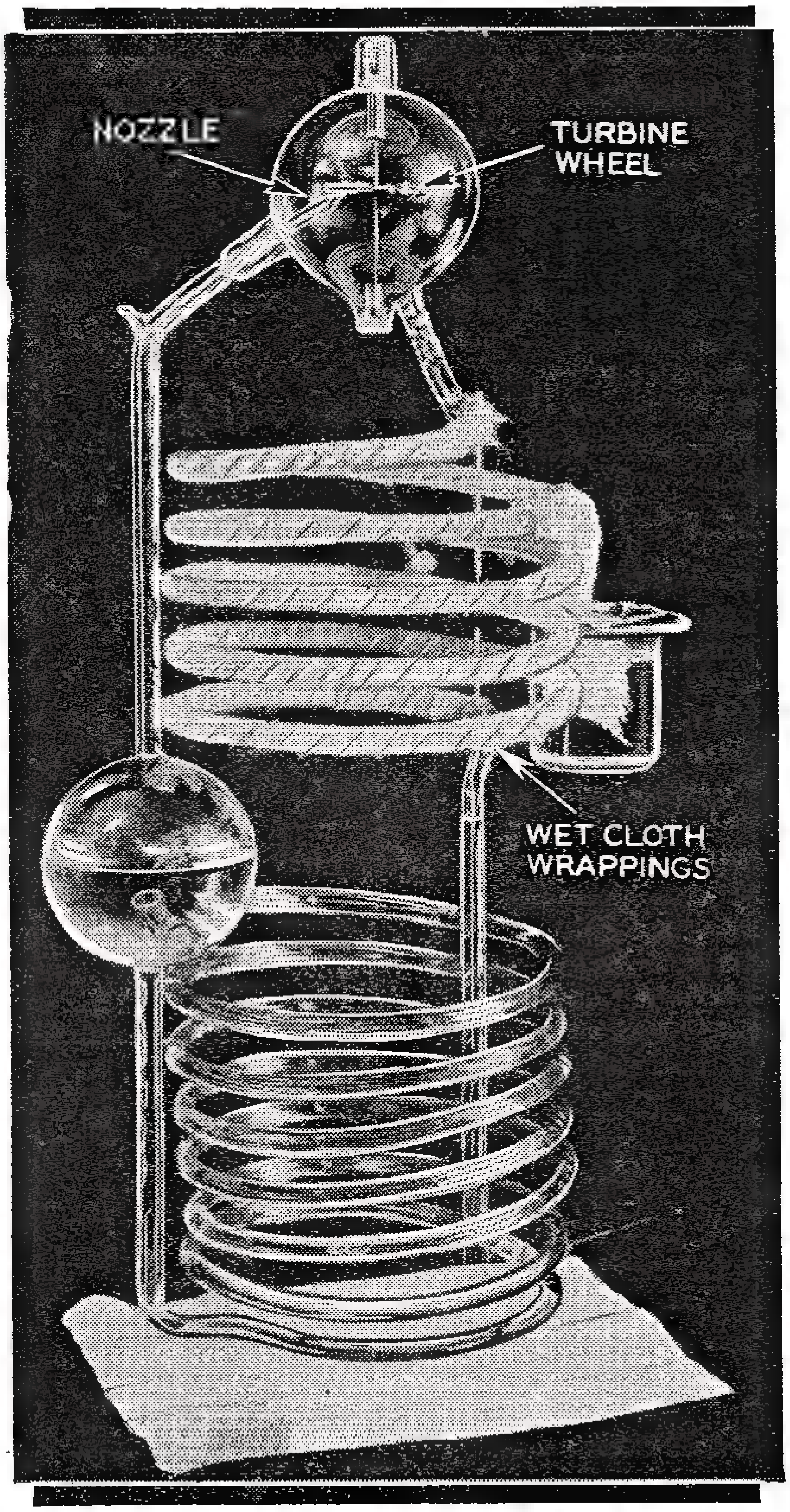
Along with the conventional boats displayed recently at the National Motorboat show held at the Grand Central Palace in New York, there were to be seen a few unusual craft which attracted wide attention. Most outstanding of these was the electric gondola that has proved extremely popular in both California and Florida waters. Next in uniqueness came the one-man life saving sub invented by Menotti Nanni, who went down to the bottom of the sea in successful tests. Below is the Chesapeake Bay log sailing canoe which warmed the hearts of devotees to sail.



Three fair navigators about to go down to bottom of the sea in Nanni's submarine.

Of especial interest to devotees of sail was this Chesapeake Bay log sailing canoe, which the stage beauties find intriguing.

Glass Vapor Turbine Is Real Perpetual Motion Machine



Nearest approach to perpetual motion machine is this atmospheric vapor power plant. Steam forming at low temperature in vacuum issues from nozzle turning turbine wheel, and is condensed in the cubes cooled by the wet cloth wrappings.

WHAT engineers claim is the nearest thing to perpetual motion is the atmospheric vapor power plant shown in the photo at the left. Made entirely of glass, except for the bearings, it utilizes the very slight difference of one or two degrees of temperature as motive power.

The operating procedure is as follows: Water in the globular shaped steam drum, from which the air has been exhausted, boils at very low temperature, the heat being absorbed from the surrounding atmosphere. The jet of steam issuing from the nozzle impinges on the turbine wheel, turning it at a neat clip. The steam then enters the condensing tubes, which are cooled by the water soaked cloth wrappings. Finally the water passes through the recirculation tubes and enters the boiler, for the beginning of another cycle.

The plant is the creation of Georgia H. Gibson, a New York engineer. Steam in his plant is generated at a rate of .004 lbs. per hour, and produces .000016 h.p.

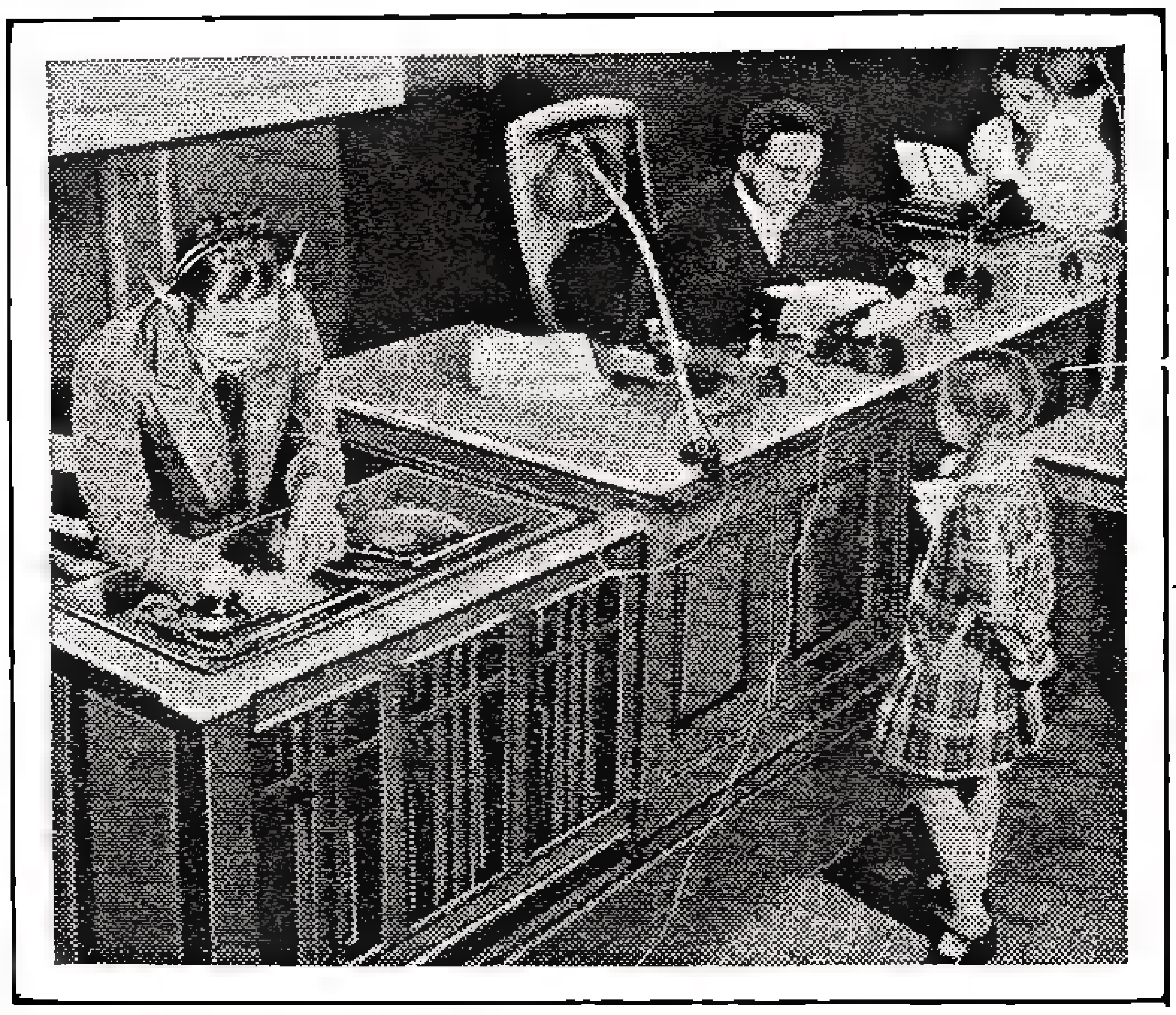
Mike Takes Down Court Testimony

A GERMAN judge has conceived the idea of making use of the recording microphone at his trials. Several microphones are stationed at various points about the court, and the whole cross-examination is recorded on phonograph discs.

In the courtroom scene below, a juvenile witness is seen telling her side of the story, while the mike takes down every question the judge asks as well as the child's answer, word for word.

Authorities find that evidence taken down in this manner is particularly helpful when children appear in the witness box, as their evidence cannot be rendered correctly in writing. In the case of adults, the attorneys have irrefutable evidence of their testimonies.

Authorities as well as all lawyers are now entitled to demand the use of the apparatus at any time in the German law courts.



Through mike on judge's desk, testimony of girl in German Juvenile court is taken down on recording device.

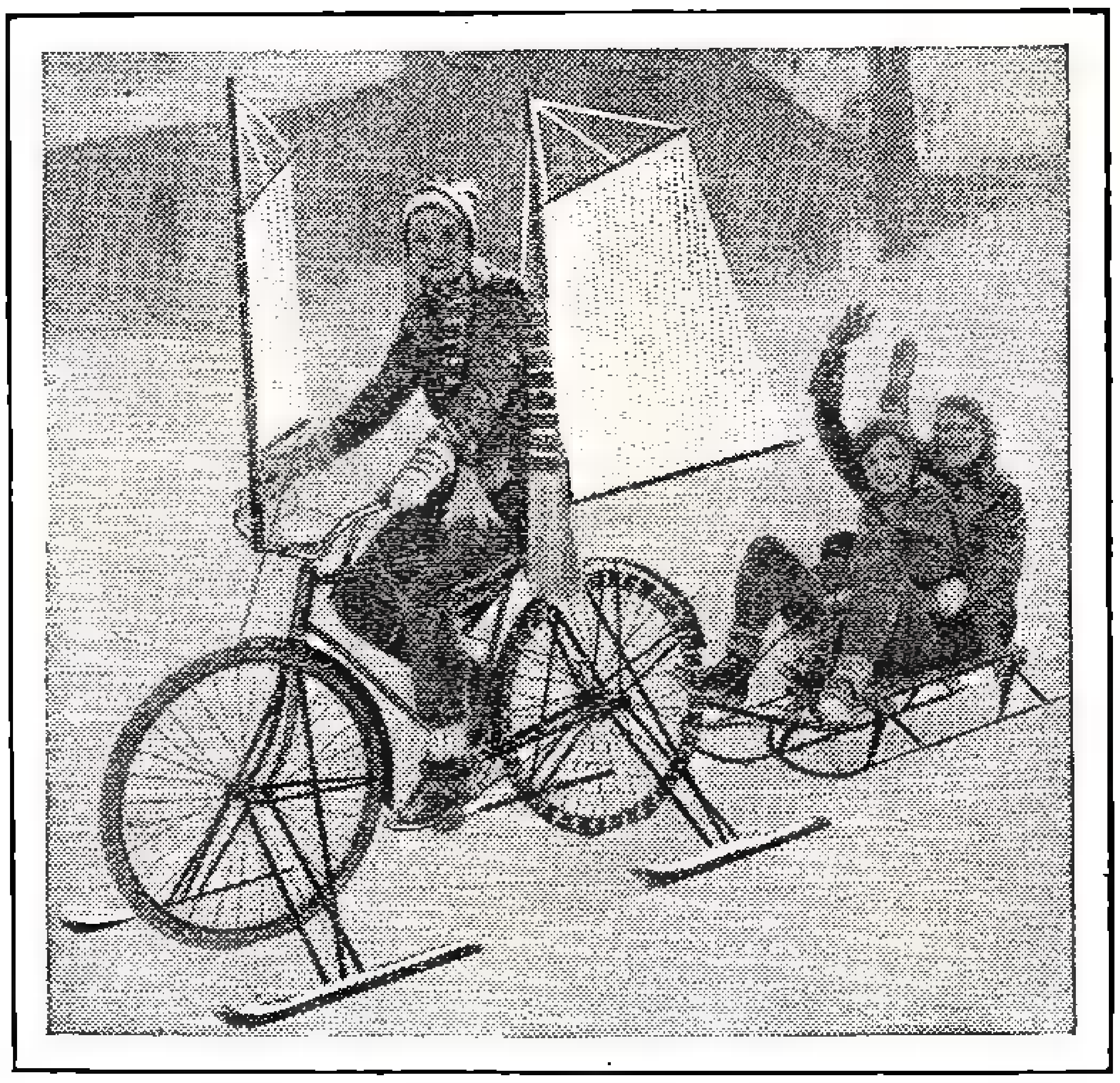
Auto Is More Deadly Than Wars

AUTOMOBILES, statistics show, are literally worse than war. During all American wars—the Revolutionary War, the War of 1812, the Mexican War, the Civil War, the Spanish-American War and the World War—the total number of Americans killed in action or who died of wounds is set down as less than 300,000.

During the last fifteen years, automobiles killed or fatally injured Americans to the number of 325,000; some eight per cent more than the fatalities of wars. In seven great disasters including the sinking of the Titanic, the Palm Beach hurricane, the San Francisco earthquake, the explosion of the Battleship Maine, and the fire at the Ohio State Penitentiary, a total of 3078 lives were taken. Yet American automobiles cause in a single year about 29,000 deaths, equivalent to 66 annual disasters like those listed.

Bike Rigged Out With Sails and Skis for Winter Sports

WHO said women have no mechanical ingenuity? Take a look at the photo at the right and see what a woman devised. This contrivance wouldn't win any big-time races but it gets there just the same, and tows a couple of passengers along behind in the bargain. The sails help a little but the main engine is the hind wheel, which is furnished with chains for traction.

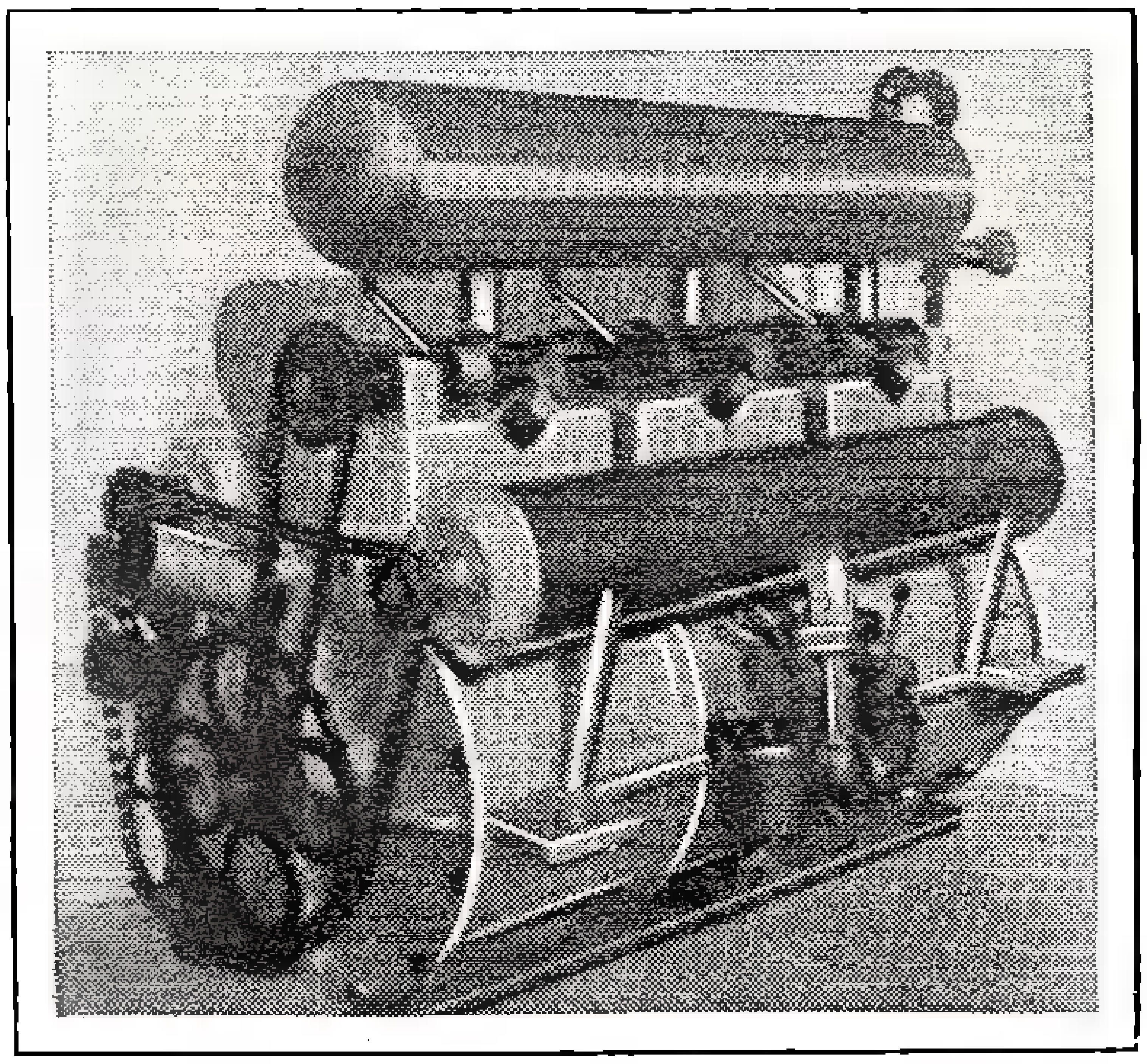


Something new in vehicles. This "watchamacallit" looks funny but it covers territory under power of sail and limb. The skis on outriggers balance the craft on ice and snow.

What Is Mark of Safe Driver?

ANY automobile driver who has had more than seven accidents, big or little, in 100,000 miles of driving is under suspicion by the National Safety Council of being too unsafe to be allowed a driver's job or even a driver's license. Extensive tests indicate that this number of accidents is the maximum permitted to drivers of moderate skill in trucking and taxi companies. Beyond this they are considered incompetent.

Gas Motor Makes Own Steam



A great saving is made possible by this new rotary engine. Dispensing with pistons, connecting rods and crankshaft, it insures minimum of vibration and running costs.

THE long felt need for a strictly rotary engine without pistons, connecting rods, crankshafts or crankcase has been filled by the development of a new type of engine by a Los Angeles inventor.

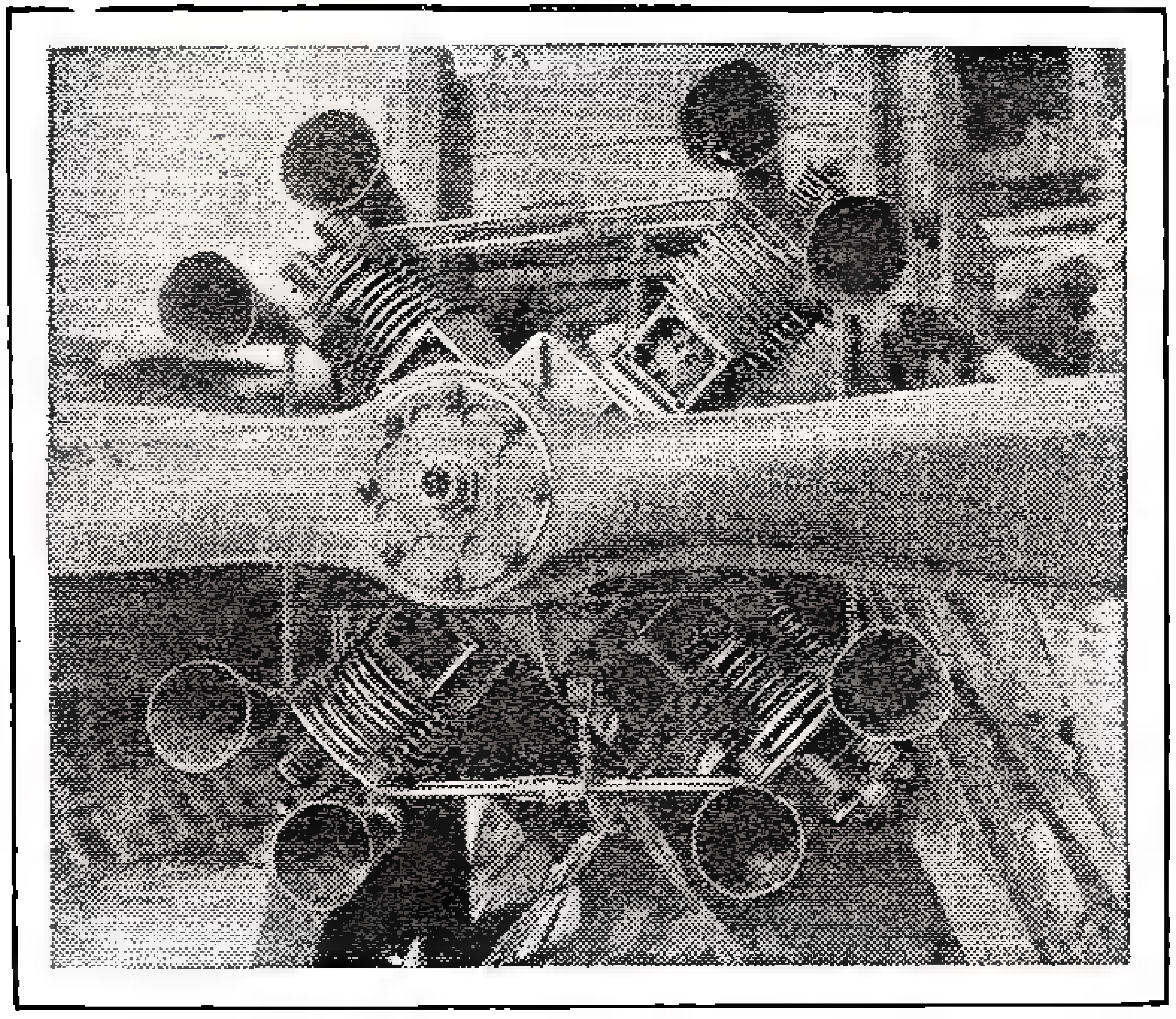
The chief feature of the machine is that it manufactures its own steam without a boiler by utilizing waste heat from the cylinders. Thus no burners are required.

The engine is seen in the photo above. Its inventors claim for it the following advantages: complete absence of vibration, no exhaust noise and consequently no need for a muffler; generates steam instantly without a boiler; needs no cylinder oil; cost of operation 50% less than reciprocating engines; requires no lubricating oil, owing to absence of crank case.

Air Funnels Cool Diesel Cylinders

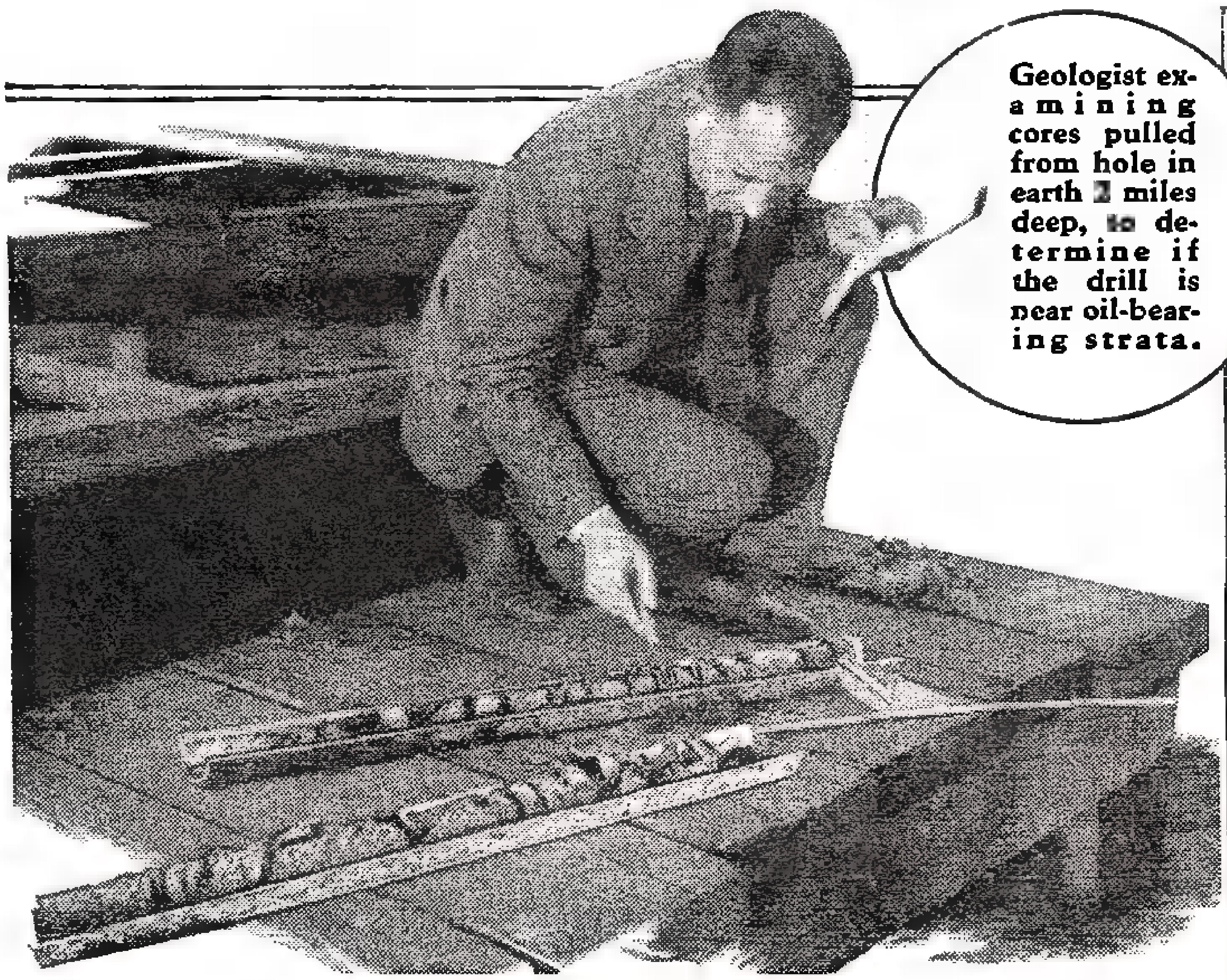
AN ENGINE that is believed to be the answer to the need for a light weight Diesel power plant for small ships has been completed and block tested by E. Norrbom, an aviation mechanic of Los Angeles.

Here are the particulars of the motor, which is shown below. It's a radial job of four cylinders, weighing 250 pounds and developing 150 horsepower at 1,400 r.p.m., swinging a prop designed for a 180-h.p. engine. Instead of gears or air charging pumps, the engine employs air funnels that pick up the air blast, and utilizes internally cooled pistons of new design. It operates on any kind of low grade fuel, including kerosene and furnace oil.



Ideal for light planes, this new Diesel weighs only 250 lbs. and develops 150 h.p. Cooling is effected through funnels which pick up the air blast from the propeller.

Strange New FACTS About



Geologist examining cores pulled from hole in earth 2 miles deep, to determine if the drill is near oil-bearing strata.

At right, core being forced from core barrel into tin trays, by water pressure. This core is a section of one as long as 50 city blocks!

Lowering the drill pipe into the hole. The core barrel is fastened onto the lower end of the drill pipe and bites its 30-foot core far below the surface, whence it goes to laboratories where it is examined microscopically by geologists.

OLD mother earth rumbled, shivered ever so slightly—then belched high into the air millions of tiny but perfect little shells. Several score people stood by curiously as the deep well in the Buttonwillow field, California, began to blow out hundreds of thousands of cubic feet of gas and many fossils.

Millions of years ago these tiny animals gave up their lives that each might contribute a drop of oil to today's supply. And now they were literally raining on the hats and shoulders of the crowd.

Seldom does man have an opportunity to see these age-old animal fossils close at hand, for they usually are buried far below the earth's surface and emerge only when some drilling crew brings them to light of day that a paleontologist may study them under powerful microscopes, thereby to determine the oil-bearing possibilities of a new field.

Geologists today are pulling the inside out of the earth exactly as a housewife lifts the center out of a doughnut. Sometimes they pull these cores from a well as deep as two miles.

And what do they find?

Footprints left there by dinosaurs and sabre-tooth tigers, perfect casts of backbones and tail fins of long-extinct fish, leaves from ancient trees, clam shells, fragments of wood, fish scales and the shells of marine animals so minute that

the EARTH

by JAMES BOWLES

Cores of stone pulled from holes two miles deep, holding in their petrified hearts the spatterings of ancient raindrops, tracks of dinosaurs, and skeletons of strange creatures long vanished from the world, tell strange tales on Mother Earth. Read here how geological detectives look back into the dawn of history.

they reveal their identity only through the microscope.

Yet these imprints in the rocks composing the earth's crust today enable geologists to turn back the pages of history far beyond man's former horizons of knowledge, revealing to them exactly how the earth's outer crust was formed.

Fossils they may be, but they're more accurate in the tales they tell than could be any human historian!

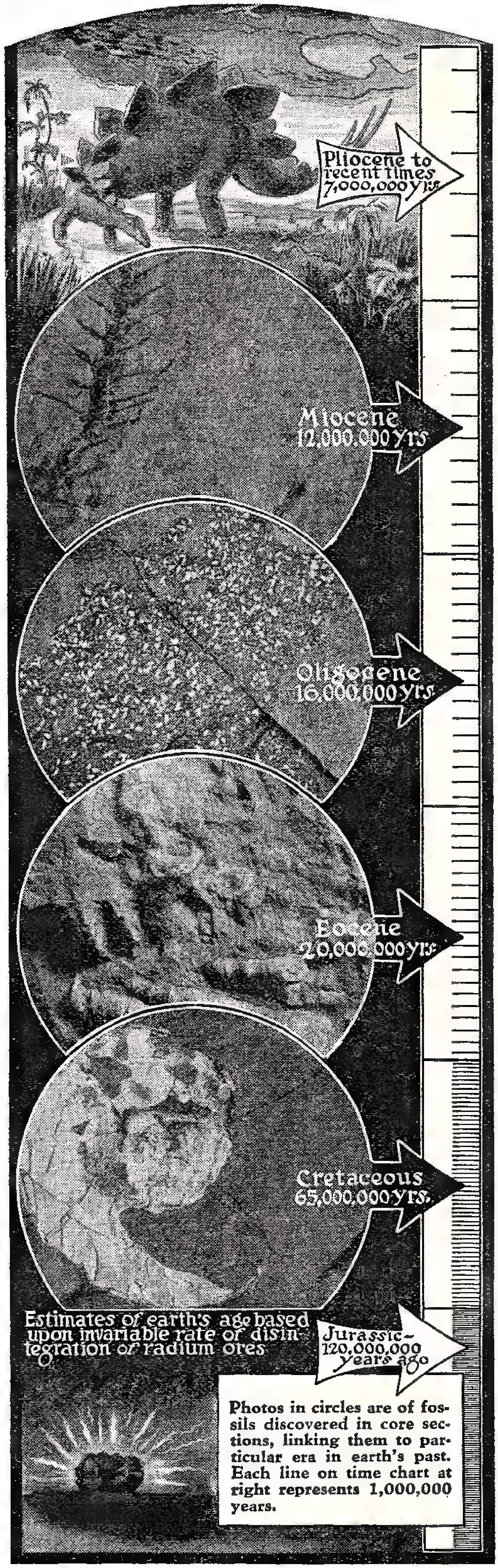
These long cores, little thicker than your wrist and longer than fifty city blocks, come to the surface in thirty-foot sections in core barrels fastened to the end of drill pipe. Once above ground, they are forced in yard-long segments into shallow metal troughs. Water, pumped under terrific pressure, accomplishes this.

These cores are usually examined in great detail, first under a hand lens, then under a microscope. Coarse and fine sands, clays, shales, limestones and conglomerates, all are readily recognized and the larger fossils, fish scales, wood fragments and like historical specimens are classified.

Frequently, though, the cores contain an abundance of smaller fossils that look like tiny white pin points to the naked eye. Through a hand lens they appear as definitely recognized shells, but their identity cannot be further determined until they are washed out of the core, mounted on slides and examined under a high-powered microscope. Then the tiny lines and shadows reveal their former identities as definitely as a fingerprint tells on its owner.

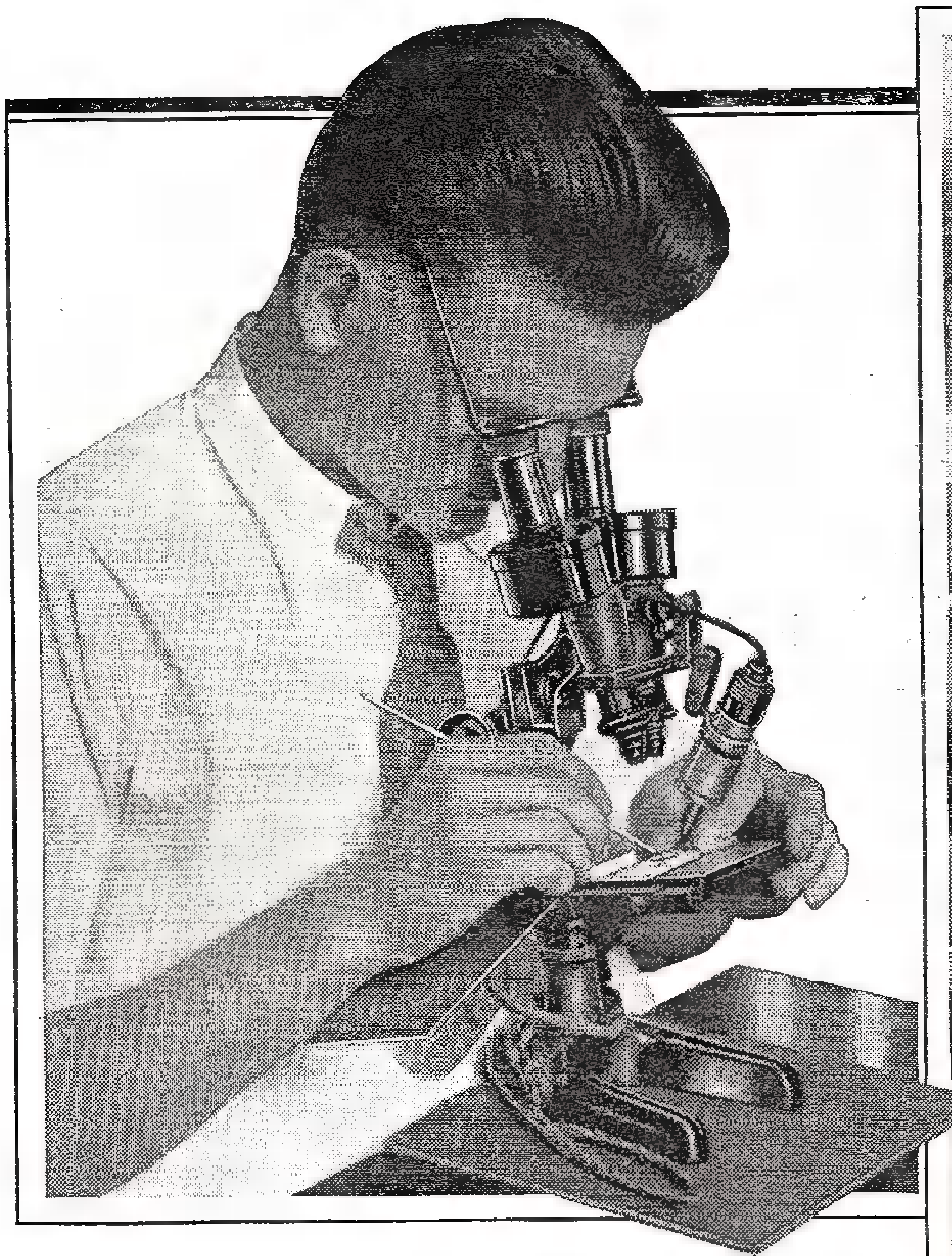
Oil experts collect these fossils as they come from holes bored deep into the earth. These men, skilled in interpreting these fossils, sometimes through no more than the impress of a delicate leaf, classify the fossils through an elaborate system of names.

"We have found from our studies of fossils collected from thousands of feet of rock layers that the character of life has undergone a gradual and systematic change from early geologic time to the present," said Desaix B. Myers, chief geologist for the Union Oil Co., of California.

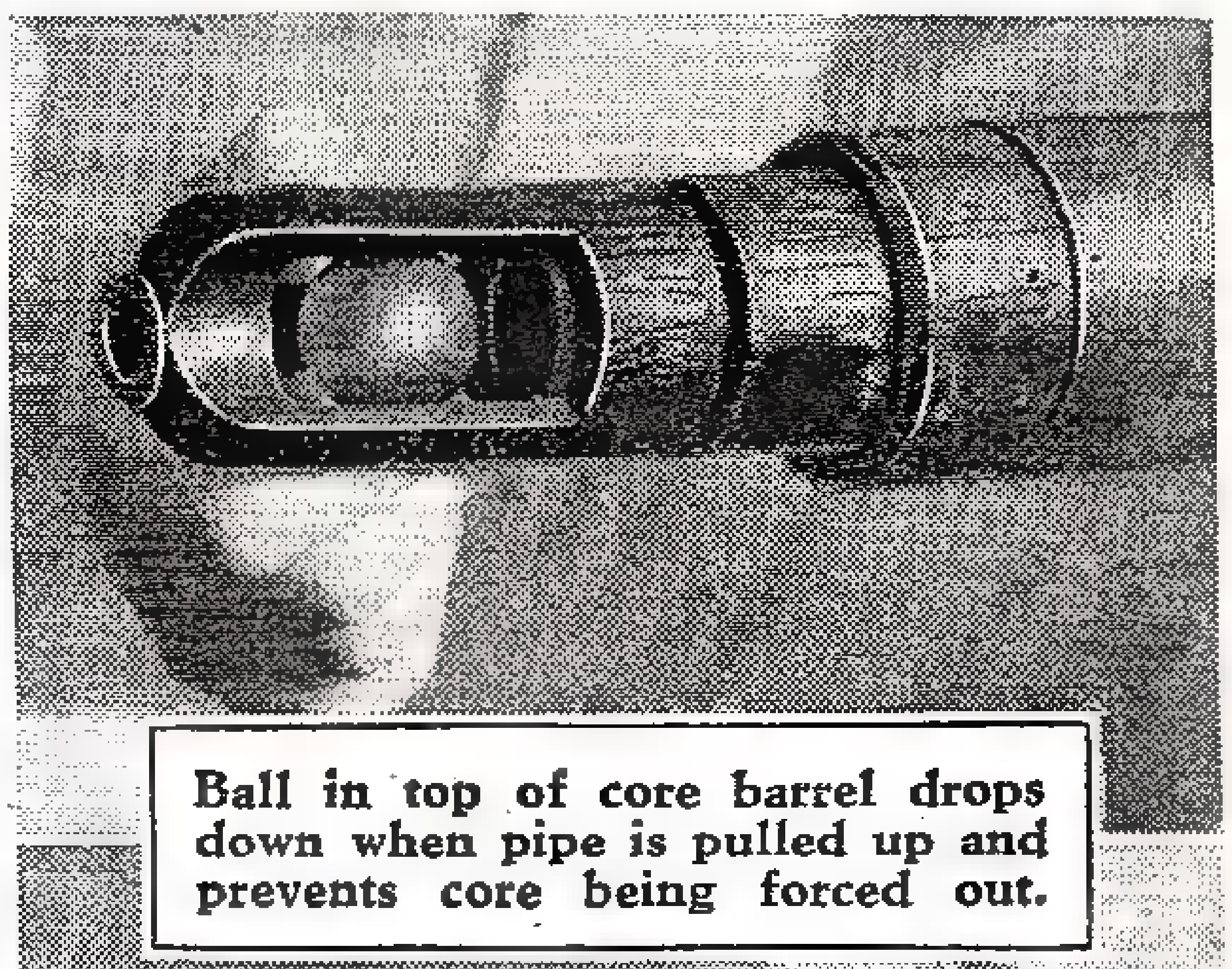

Pliocene to recent times 7,000,000 yrs
Miocene 12,000,000 yrs
Oligocene 16,000,000 yrs
Eocene 20,000,000 yrs
Cretaceous 65,000,000 yrs.
Estimates of earth's age based upon invariable rate of disintegration of radium ores
Jurassic— 120,000,000 years ago

Photos in circles are of fossils discovered in core sections, linking them to particular era in earth's past. Each line on time chart at right represents 1,000,000 years.

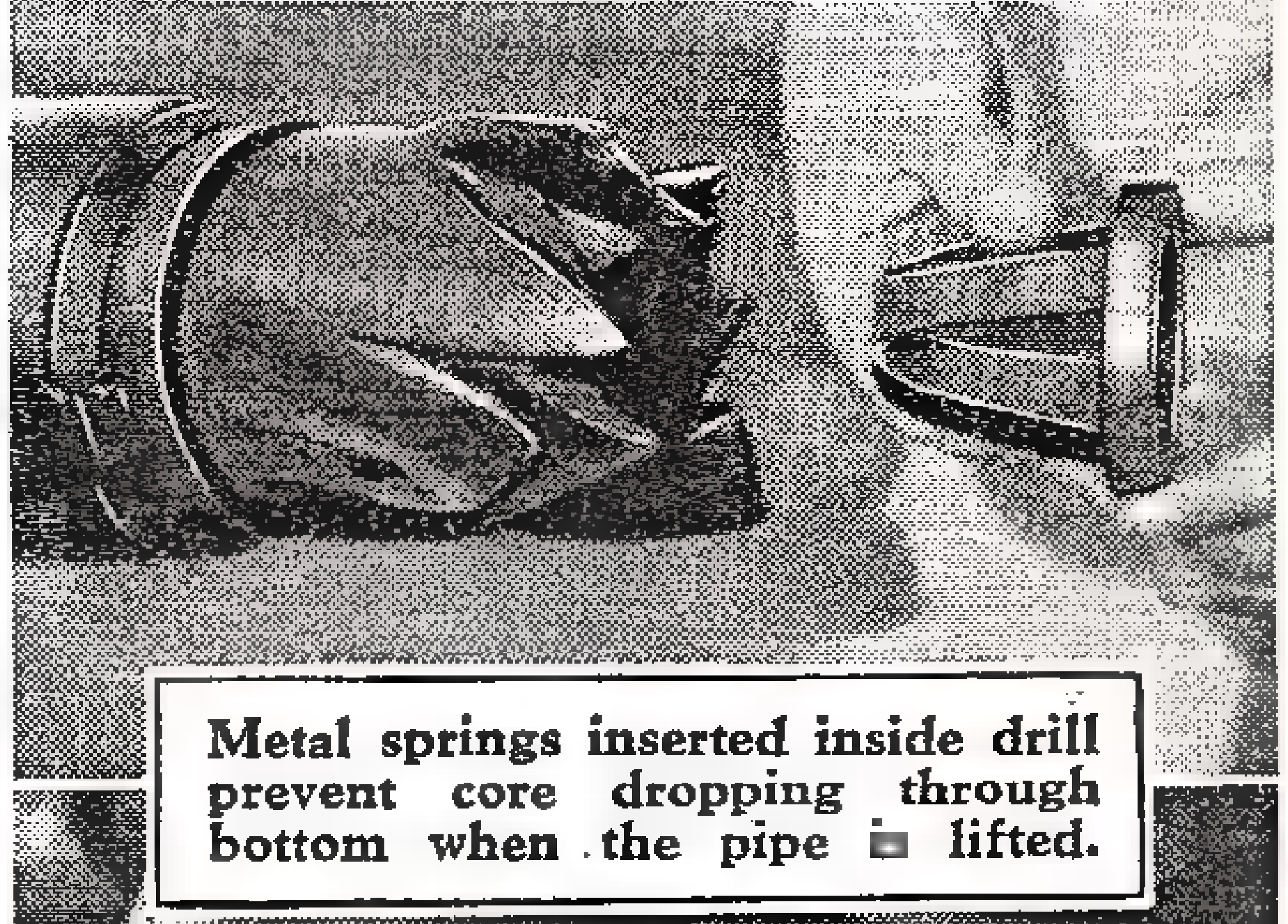
Microscope Probes Secrets of Cores Entrapped in Ingenious Drill Pipe



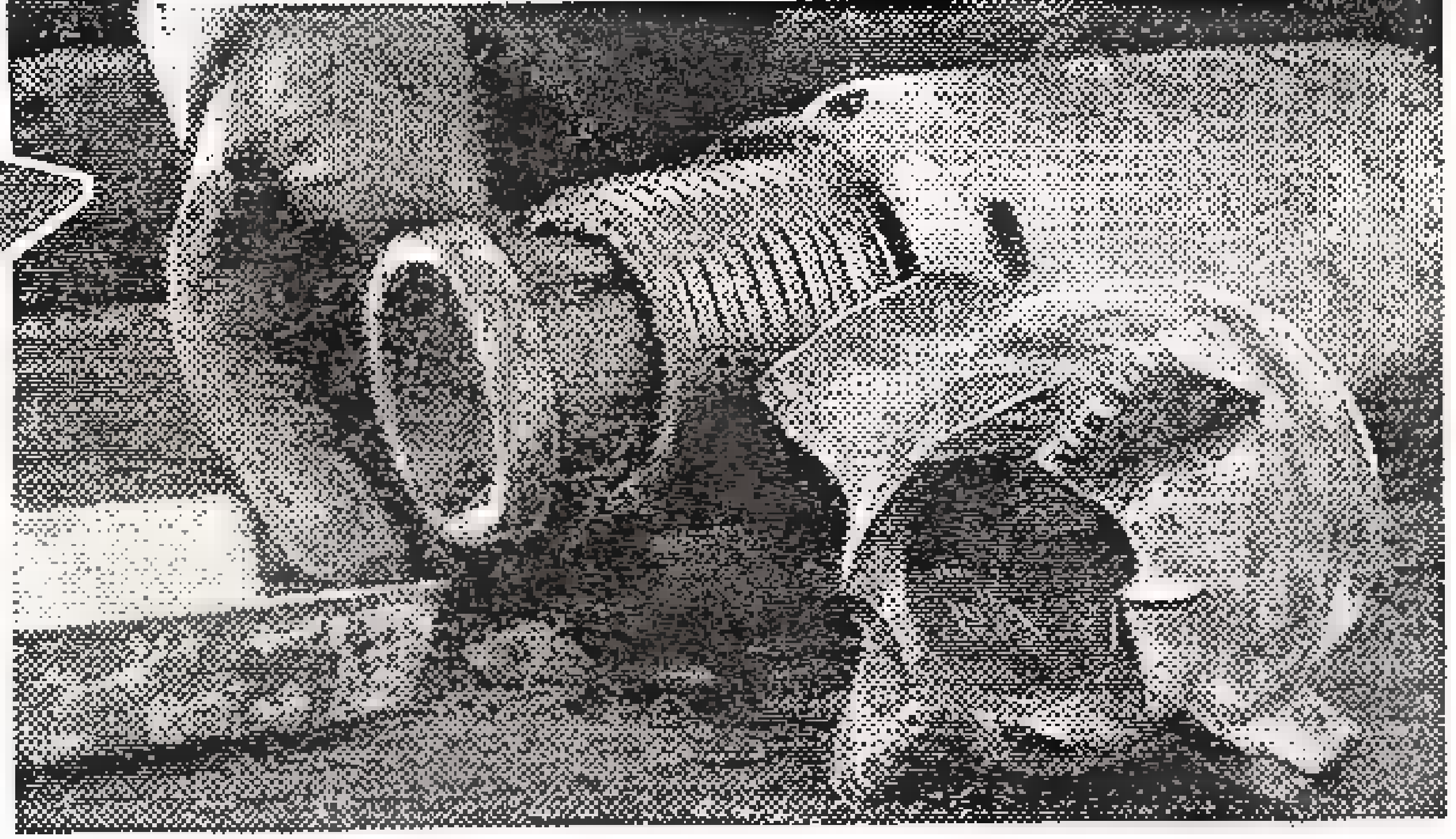
Section of core being examined under powerful microscope. This oil company laboratory worker is able to tell his employers just where to drill their wells, through information the cores give him.



Ball in top of core barrel drops down when pipe is pulled up and prevents core being forced out.



Metal springs inserted inside drill prevent core dropping through bottom when the pipe is lifted.



Closeup view of the core just as it is being forced into tray. Note drill bit, which has just been unscrewed and removed.

"It often is possible to find in an area of good rock exposures, an occasional rock layer with fossils radically different from those in layers directly above and below.

"Why? Rock layers containing marine fossils were formed of sediment laid down along the sea bottom when the sea was much more extensive than at present. In fact, many such individual layers were distributed over wide areas.

"Then what happened? Since these beds were laid down, the sea has receded and gigantic mountain-making movements of the earth have uplifted these beds in scattered areas, now represented by our mountains and hills. This exposes these ancient layers and makes them available for study.

"By careful examination of the fossils from rocks of these scattered areas we can compare and correlate rock layers or groups of layers containing distinct fossils from one area to another even though these areas may be separated several hundred miles."

With this information the paleontologist by "reading" the fossils, assists the field geologist in determining whether the shale formation in a new area under investigation is the same as one in a distant oil-producing field or whether another nearby sandstone formation actually is a continuation of the same porous sandstone which contains and yields the oil being produced in that distant field.

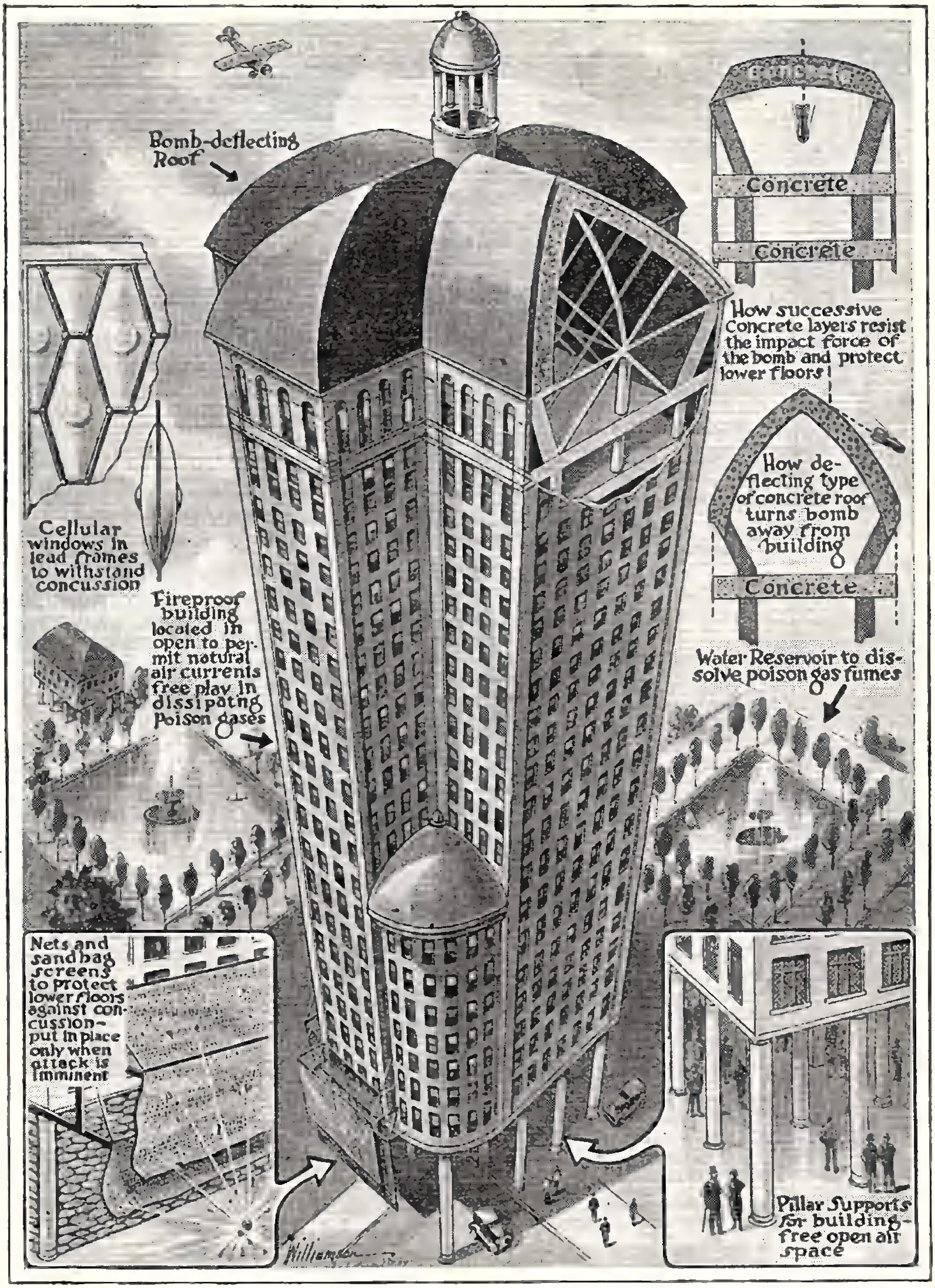
These historians in oil often locate new fields by studying under the microscope the tiny foraminifera who gave up their lives possibly sixty million years ago that today gasoline might power our engines and oil lubricate our bearings.

Particularly in the west, these "historians" use all the evidence they can find, especially from fossils. In many oil-producing areas, such as the San Joaquin valley and the Los Angeles basin, broad areas contain no rocks exposed to aid the geologist in his search for oil bearing rock. Here he depends largely on studies of cores from wells already drilled.

He studies them not in the field, among oil-smeared derricks, but in the laboratory. You will find him, bent over a microscope, peering intently at hard rock samples, brought up possibly a mile, picking out and classifying the foraminifera. Often he finds a hundred species in one sample.

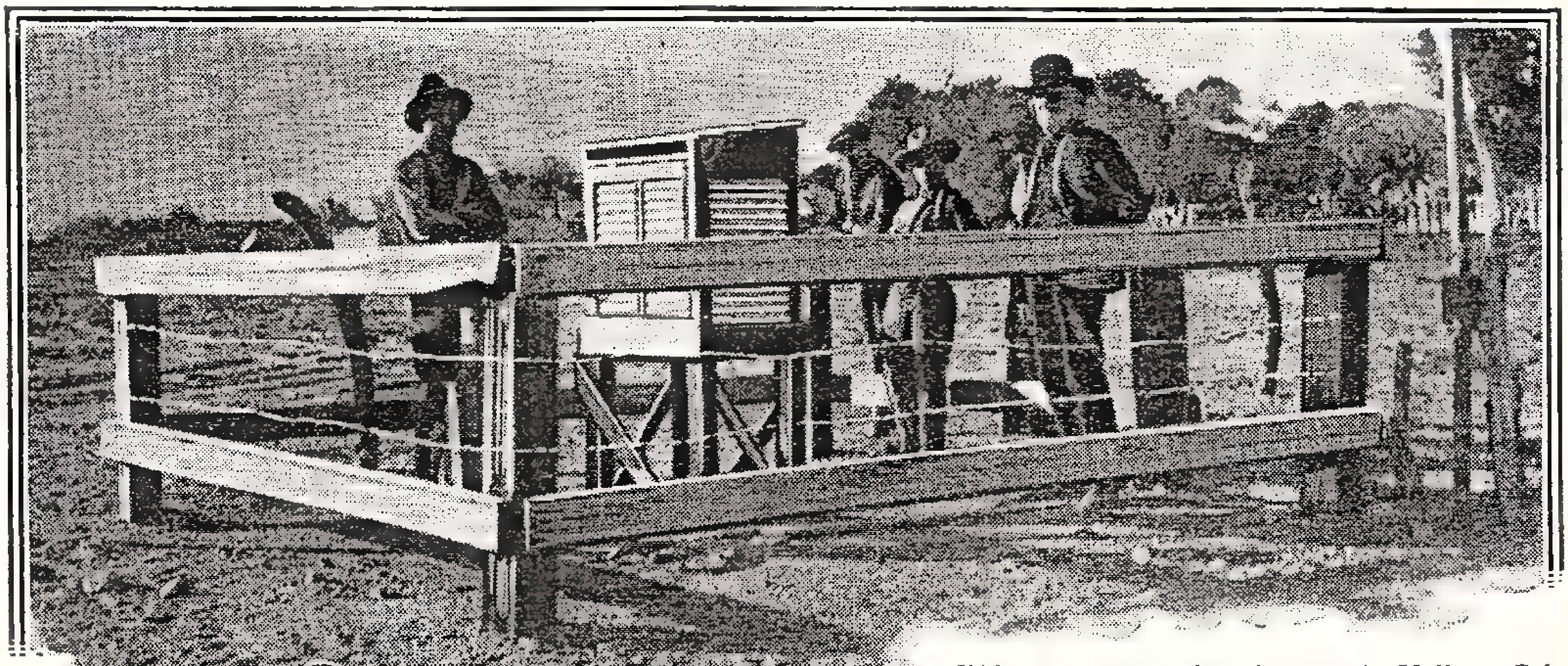
(Continued on page 137)

New Ideas in Bombproof Buildings

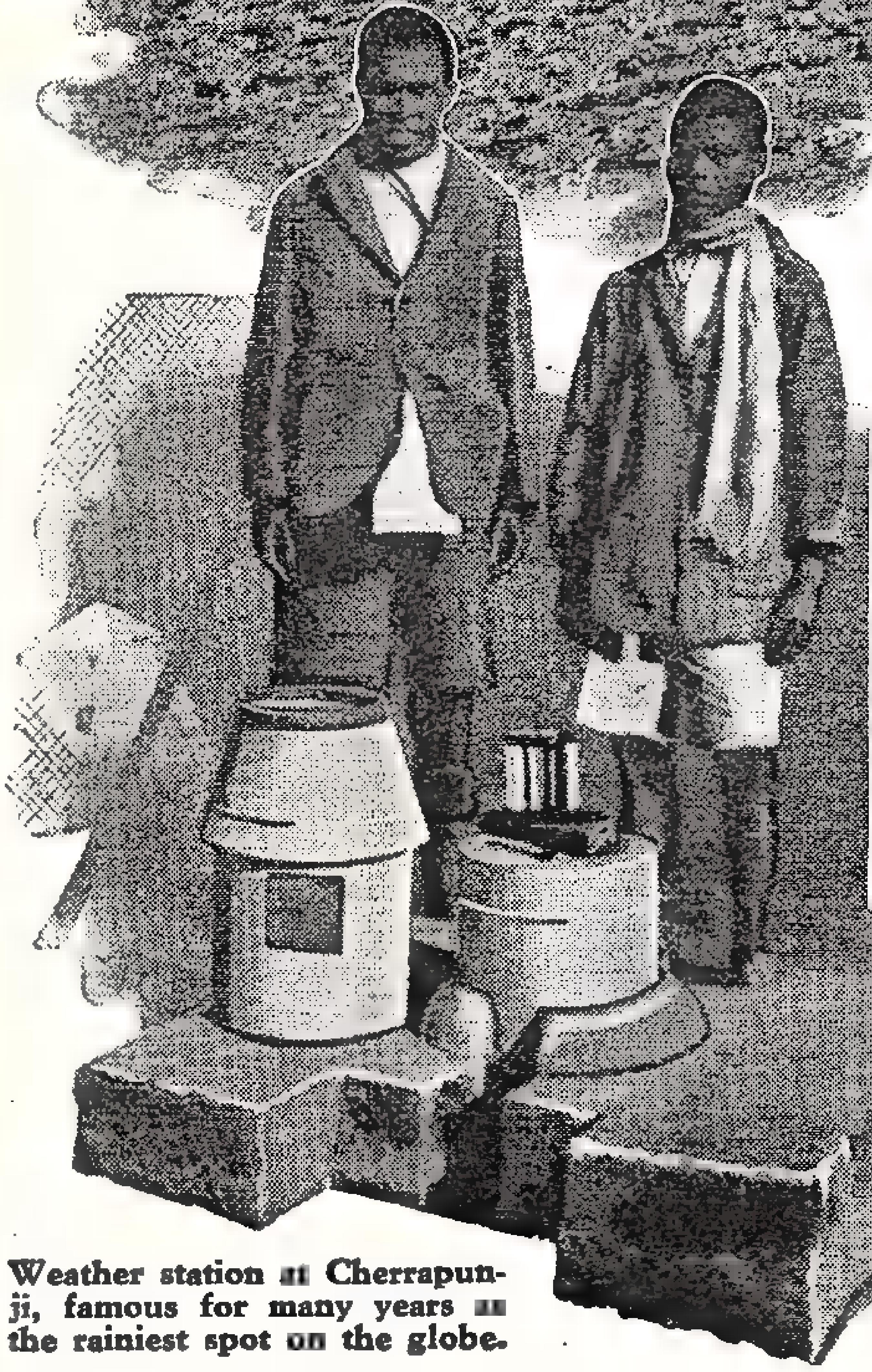

Bomb-deflecting Roof
Concrete
Concrete
How successive concrete layers resist the impact force of the bomb and protect lower floors
How deflecting type of concrete roof turns bomb away from building
Concrete
Cellular windows in lead frames to withstand concussion
Fireproof building located in open to permit natural air currents free play in dissipating poison gases
Water Reservoir to dissolve poison gas fumes
Nets and sandbag screens to protect lower floors against concussion—put in place only when attack is imminent
Pillar Supports for building—free open air space
Williamson

European nations are much exercised over the possibility that future wars will result in the utter destruction of large cities through the medium of air bombs. To prevent such catastrophes, a new protective style of architecture has been proposed by a French expert, M. Paul Vauthier, incorporating features shown in the above drawing. It is interesting to note that his suggestions include the idea of supporting floors by longitudinal steel girders rather than by the wall (not shown in drawing)—a feature of American skyscraper construction so familiar that it has become quite commonplace in this country.

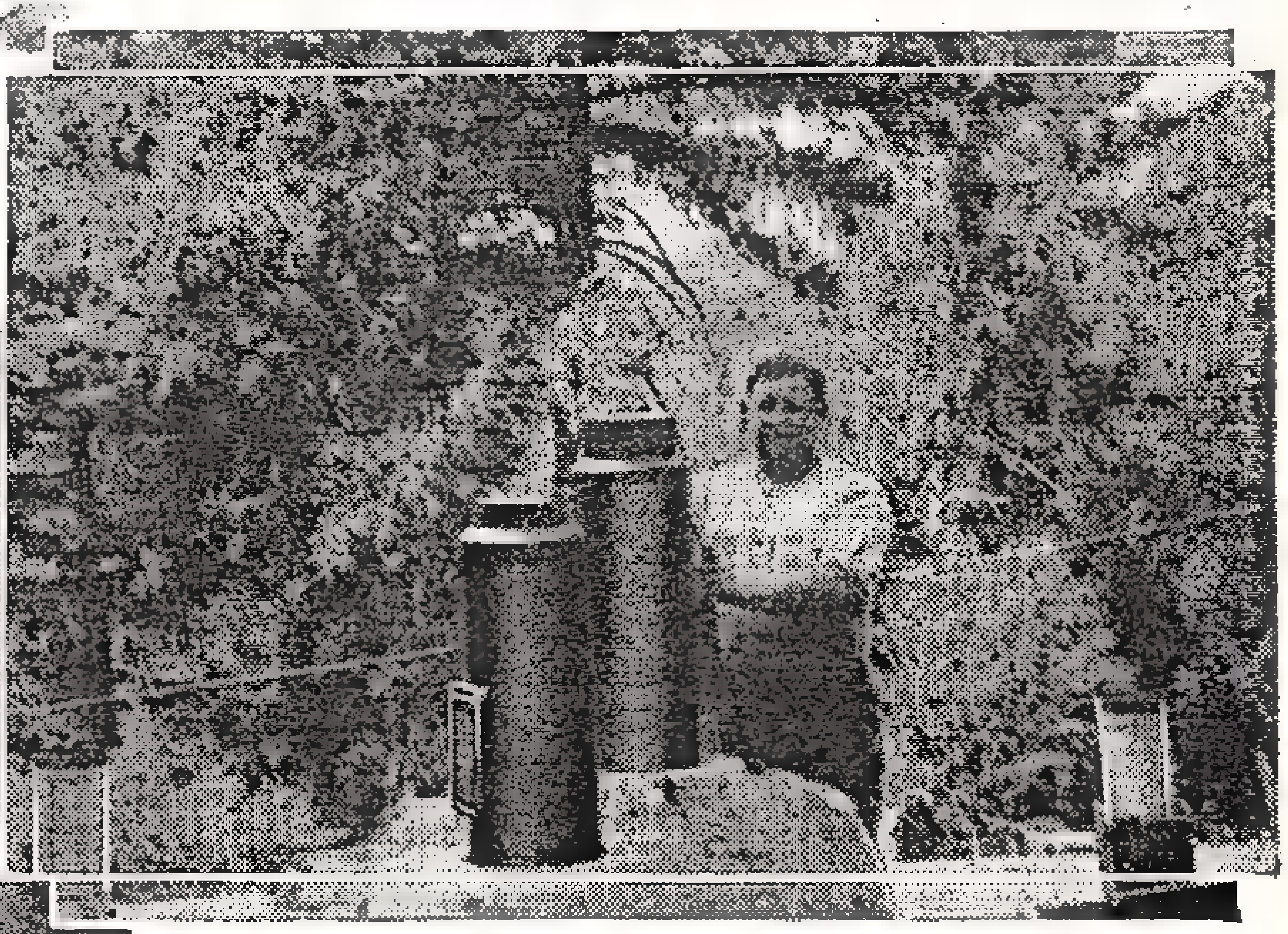
BLUE RIBBON Records



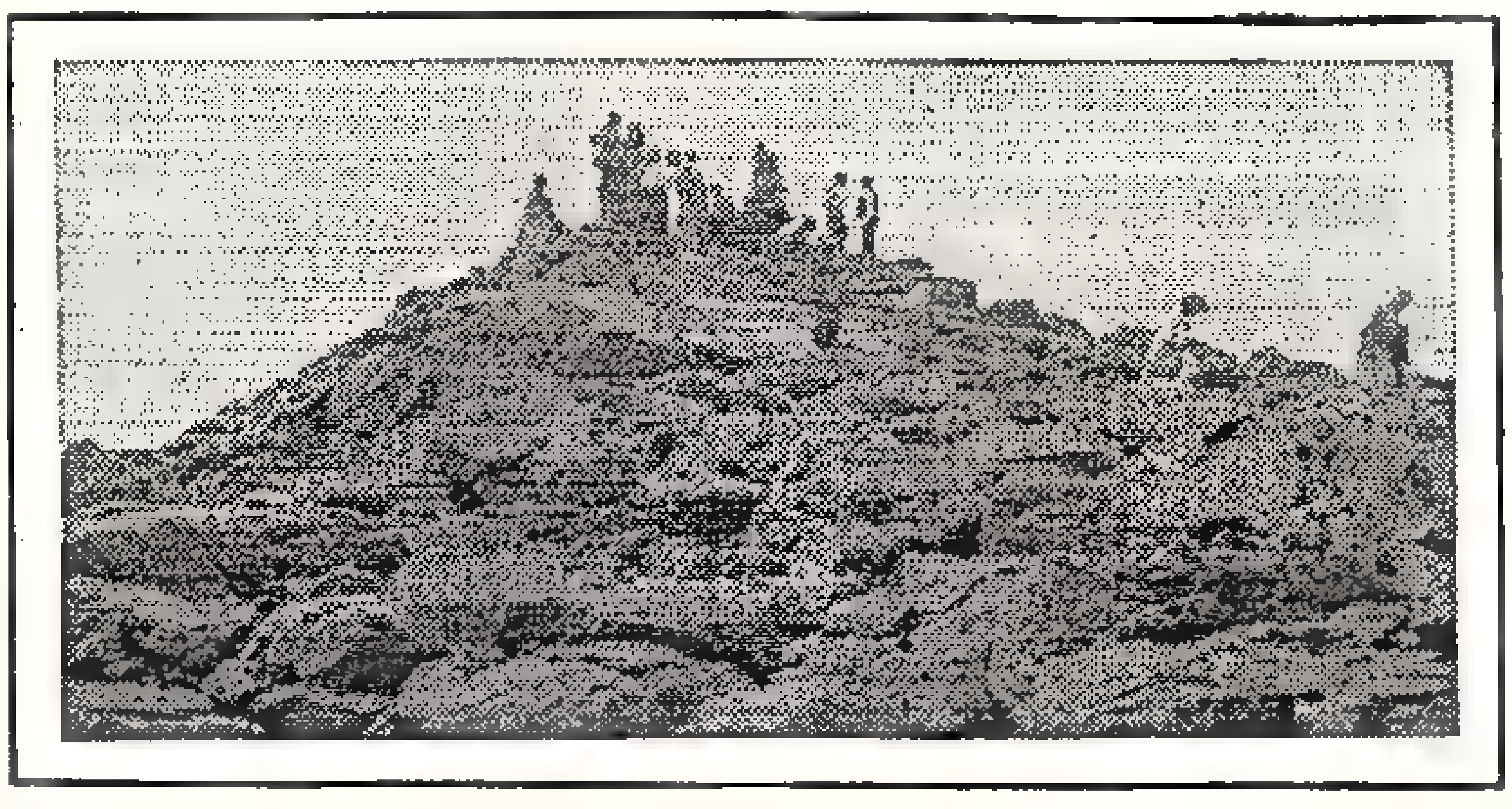
This weather station in Death Valley, Cal., registered 134° in the shade in 1913, but in 1922 the record was beaten by Azizia, Tripoli, where temperature of 136° was recorded.



Weather station at Cherrapunji, famous for many years as the rainiest spot on the globe.



At this spot, Opid's Camp, California, fell the heaviest brief shower ever measured—1.03 inches in a minute!



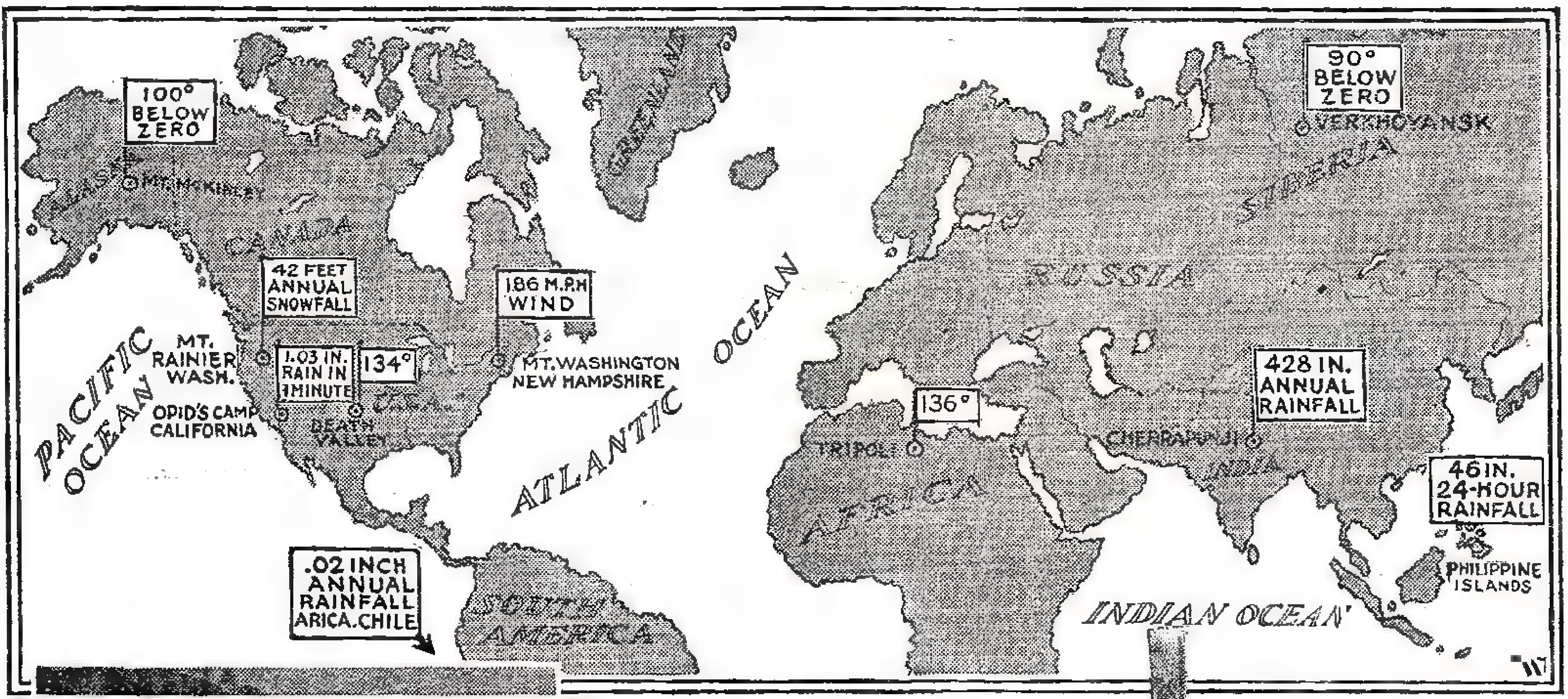
On this peak of Mt. Washington, New Hampshire, was hung up the world's record for a measured wind—186 miles per hour!

THE world's hottest weather does not occur near the equator, or in the torrid zone, but in subtropical deserts of the north temperate zone, in summer. The Weather Bureau station at Greenland Ranch, Death Valley, California, registered 134 in the shade on July 10, 1913. This remained a world record until September 13, 1922, when 136 was registered at Azizia, 25 miles inland from the city of Tripoli, in northern Africa.

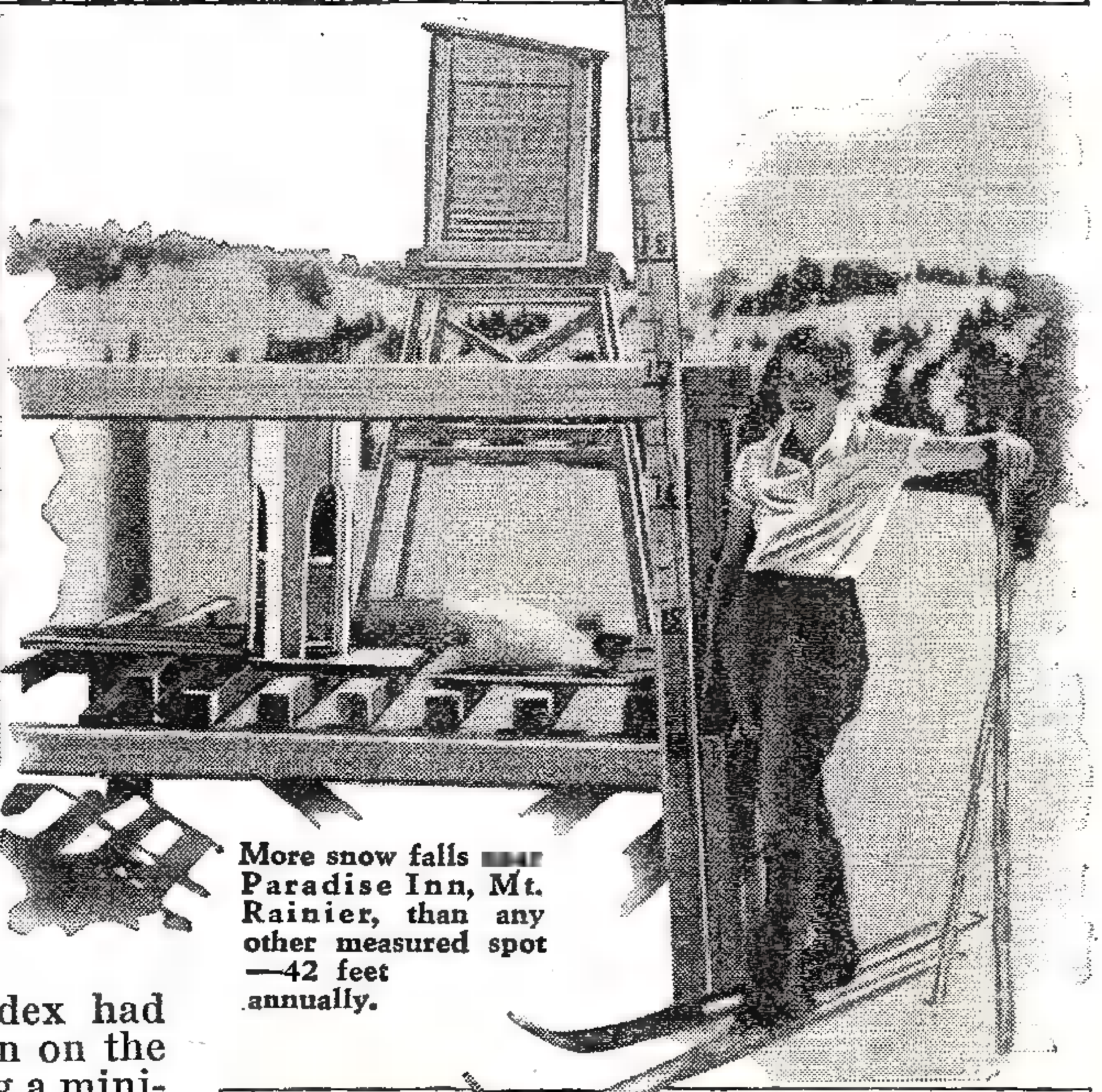
The lowest temperature ever observed at a regular meteorological station was 90 below zero, on February 5 and 7, 1892, at Verkhoyansk, Siberia, which lies only one degree of latitude north of the Arctic Circle.

The famous minimum thermometer that the late Archdeacon Hudson Stuck cached on Parker Pass, 15,000 feet up the slope of Mount McKinley, Alaska, in June, 1913, was recovered last May by the

# of the WORLD'S Weather


100° BELOW ZERO
ALASKA
MT. McKINLEY
CANADA
GREENLAND
42 FEET ANNUAL SNOWFALL
186 M.P.H WIND
MT. RAINIER WASH.
1.03 IN. RAIN IN 1 MINUTE
134°
MT. WASHINGTON NEW HAMPSHIRE
OPID'S CAMP CALIFORNIA
DEATH VALLEY
U.S.A.
PACIFIC OCEAN
ATLANTIC OCEAN
.02 INCH ANNUAL RAINFALL ARICA. CHILE
SOUTH AMERICA
90° BELOW ZERO
VERKHOYANSK
SIBERIA
RUSSIA
136°
TRIPOLI
AFRICA
428 IN. ANNUAL RAINFALL
CHERRAPUNJI
INDIA
46 IN. 24-HOUR RAINFALL
PHILIPPINE ISLANDS
INDIAN OCEAN

This famous Benguet road in the Philippines was practically wiped out by the world's heaviest 24-hour rainfall—46 inches. Map at top shows distribution of weather records.



More snow falls near Paradise Inn, Mt. Rainier, than any other measured spot—42 feet annually.

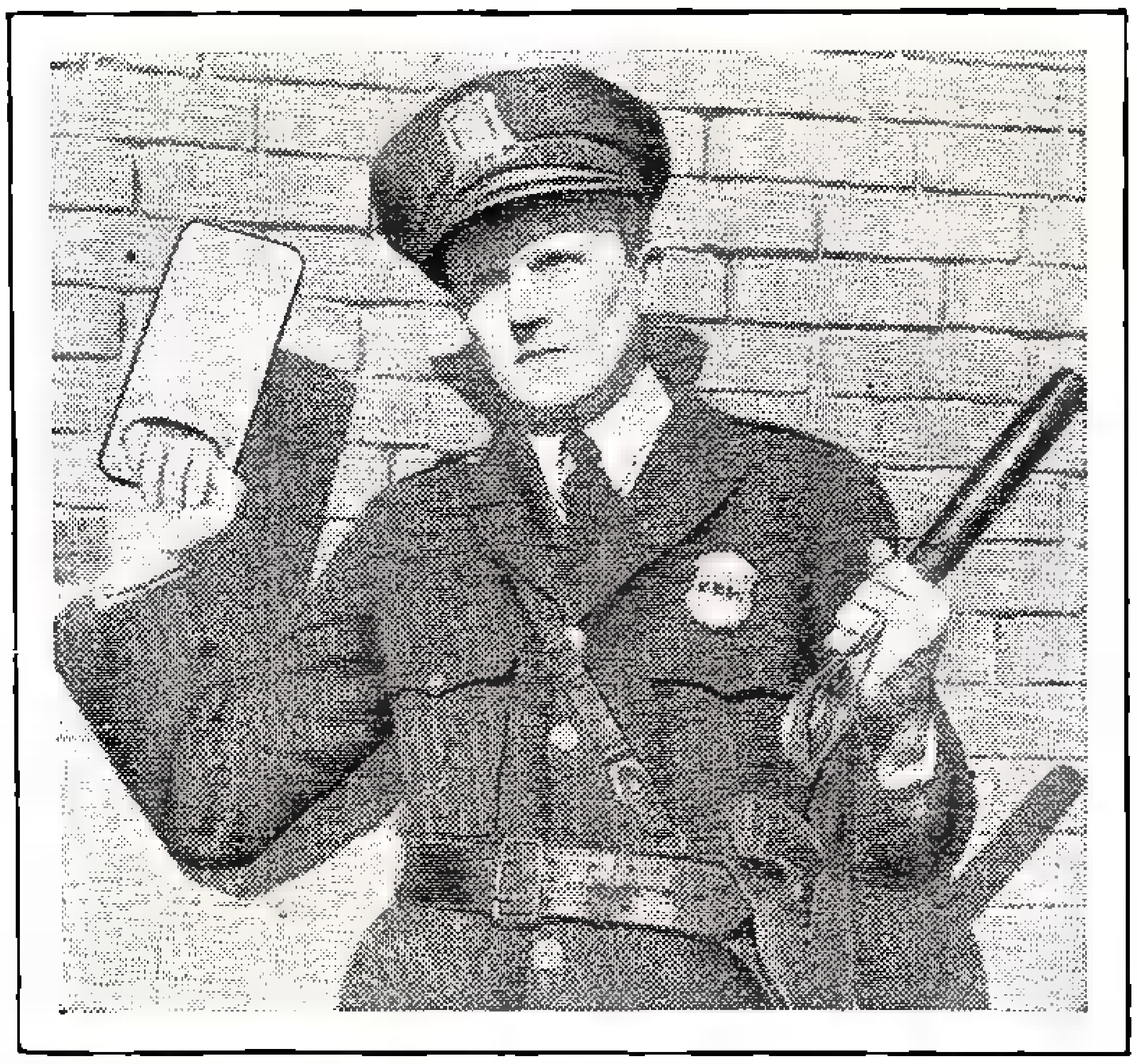
Lindley-Liek expedition. Its index had gone beyond the lowest gradation on the scale and into the bulb, indicating a minimum temperature, some time during the 19 years the instrument lay on the mountain, at least as low as 100 degrees below zero—possible lower!

The heaviest mean annual rainfall obtained from a long and trustworthy series of measurements is 428 inches a year (about ten times the average for New York City) at the village of Cherrapunji, 4,300 feet above sea level, in the Khasi Hills district of Assam. The lightest is 0.02 inch a year at Arica, Chile.

The heaviest 24-hour rainfall on record was 46 inches, falling from noon, July 14, to noon, July 15, 1911, at Baguio, the mountain health resort and former "summer capital" of the Philippines.

Recovering the famous minimum thermometer cached on Mt. McKinley, Alaska, which recorded temperatures lower than 100 degrees below zero, over a period of 19 years.

Flat Rubber Police Billy Stuns Without Raising Bumps



Padded blow of rubber mace does not cause contusions on flesh of victim, yet stuns him into unconsciousness.

A NEW policeman's mace put into use by the Indianapolis Police department strikes a stunning blow that subdues quickly and comparatively painlessly, and without any blood-letting and skull-cracking. The "slapper," as the new billy is called, is a flat piece of rubber, as shown in the photo, rectangular in shape and containing a slot through which the fingers of the hand may be slipped to obtain a grip.

The chief advantage of the slapper is that it leaves absolutely no disfigurements or marks, so that the suspect has nothing to show for his third degree. If more force is needed, the edge of the weapon may be used with the effectiveness of the old time club.

College fraternities have seen possibilities in the new club, for it is an excellent instrument for paddling freshmen. Cost of production of the slapper is far below that of the standard billy.

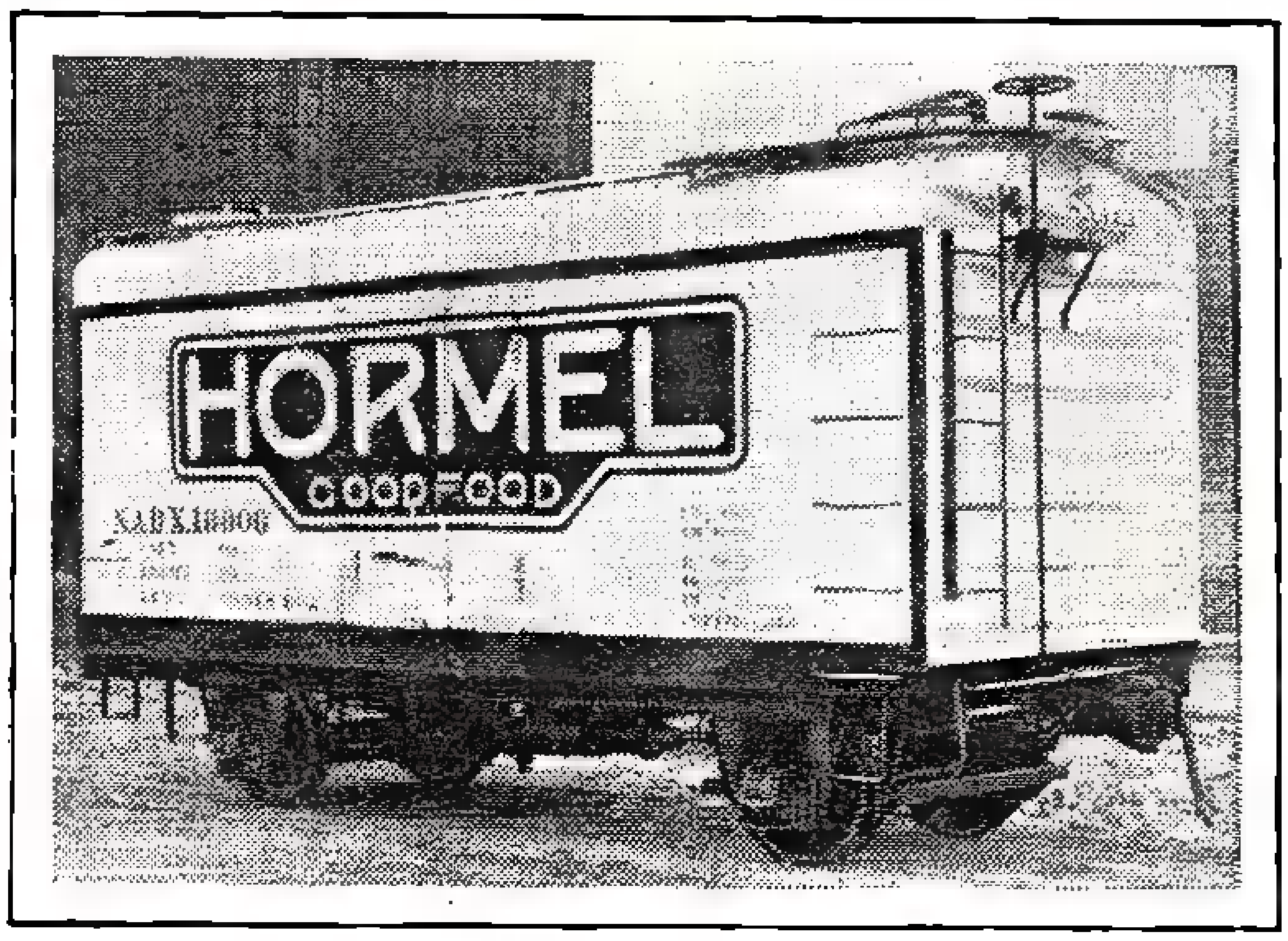
Roof Gardens for Stackless Ships

OCEAN steamships without the conventional smokestacks or funnels, so that the top of the vessel may be made into one broad sun parlor or roof garden, are being designed by a British ship-building firm. In spite of the complete elimination of smokestacks, these new steamers will burn coal just as ordinary steamers do. The secret lies in new methods of consuming smoke and saving waste heat that have been worked out by marine engineers.

Half Size Car for Perishables

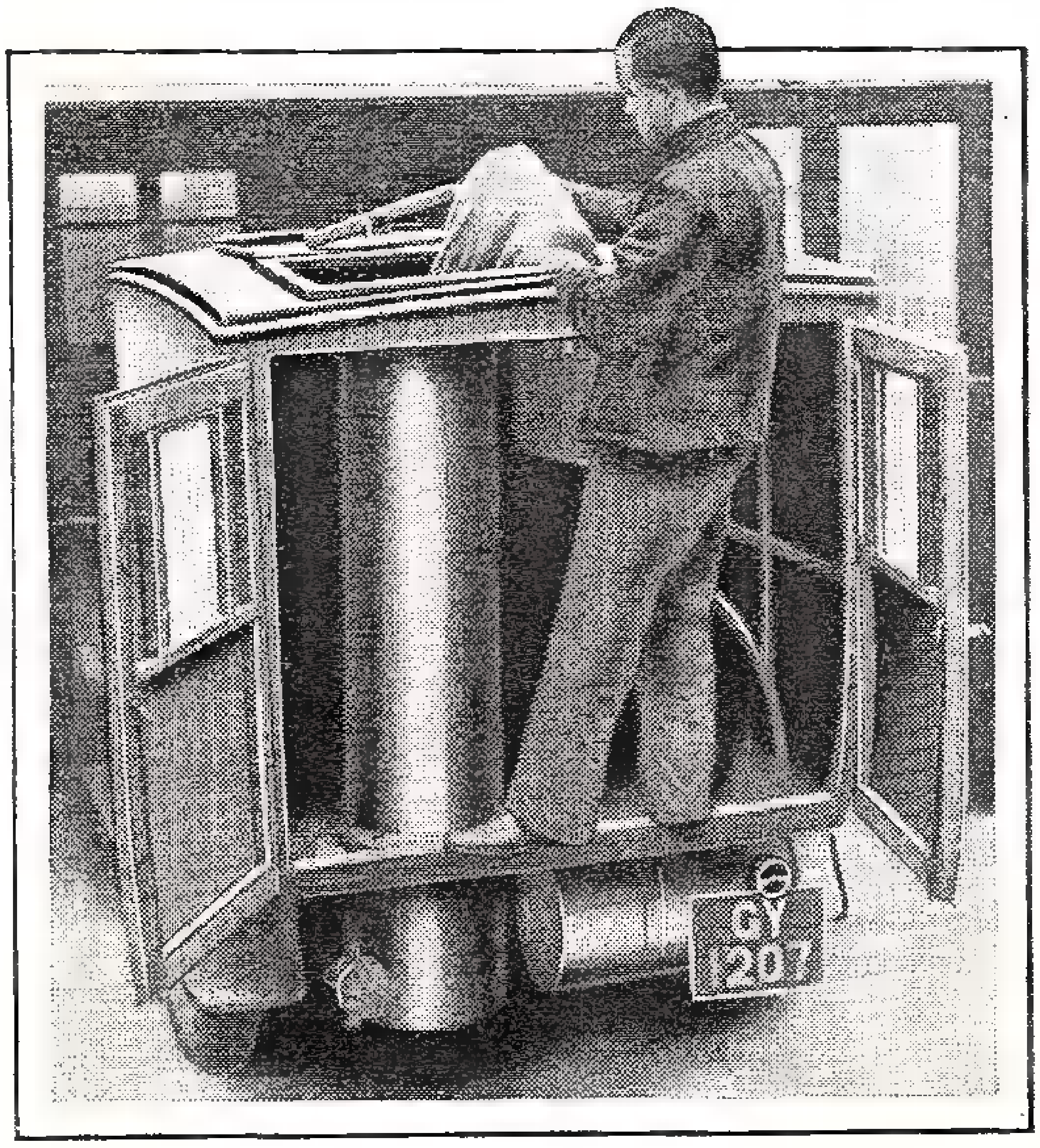
FOLLOWING the European practice of using small freight cars, a manufacturer of railroad equipment has introduced a half-size car especially designed to stand up under the high speed of American-operated trains. It is approximately half the length of the standard car and has four wheels instead of eight, as may be seen in the photo below.

The car is 22 feet long, and has a wheelbase of 13½ feet, standard double coil springs and air brake equipment.



Measuring half size of standard carrier, this new freight car is ideal for shipping small quantities of perishables.

Auto Makes Own Fuel From Coal

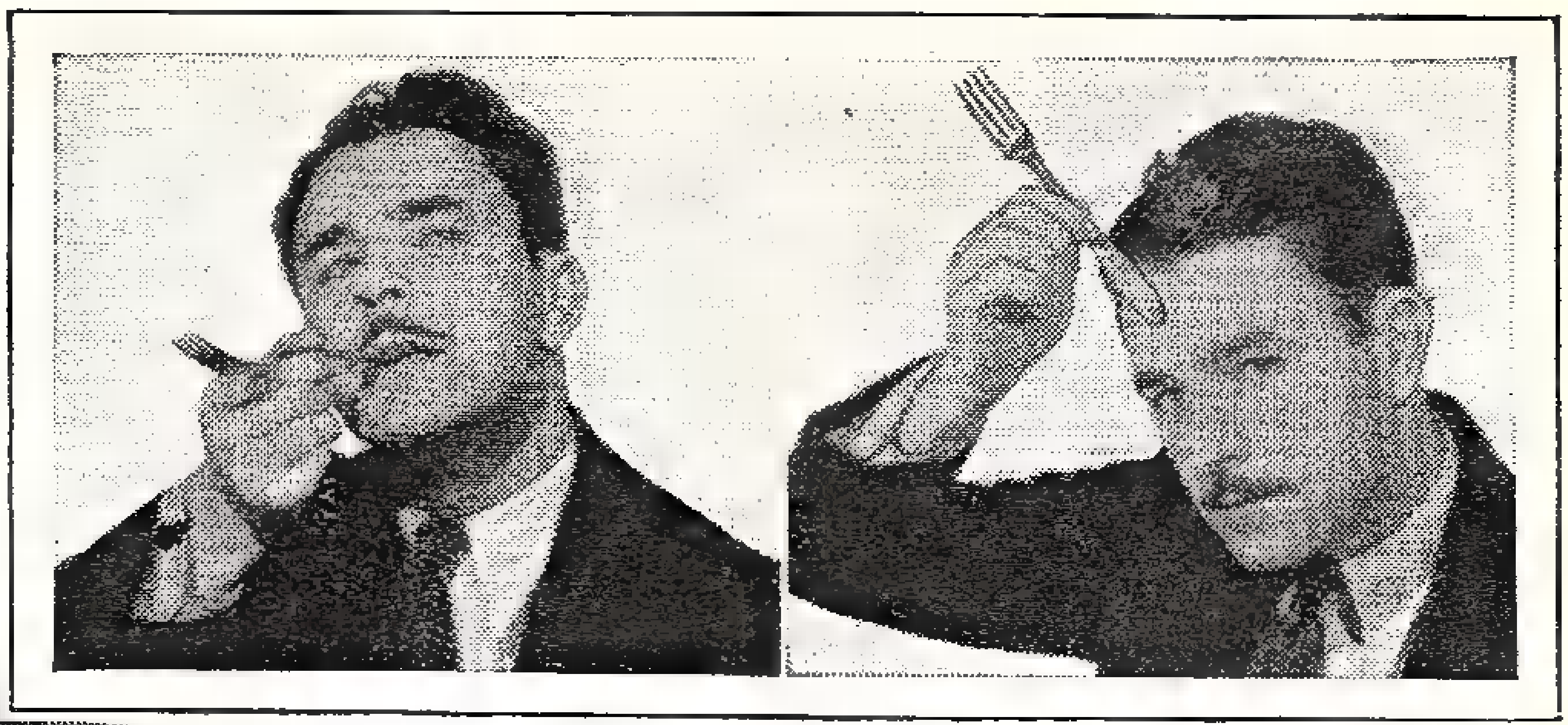


250-lb. charge of coal poured into tank furnishes fuel for 300-mile run. Coal gas to operate engine is made en route.

THE latest development in the automotive field is a car driven by coal gas which is actually manufactured while the auto is in motion. At the rear of the car is a coal burner which consumes anthracite, one filling of 2500 pounds being sufficient to supply gas for a 300-mile run.

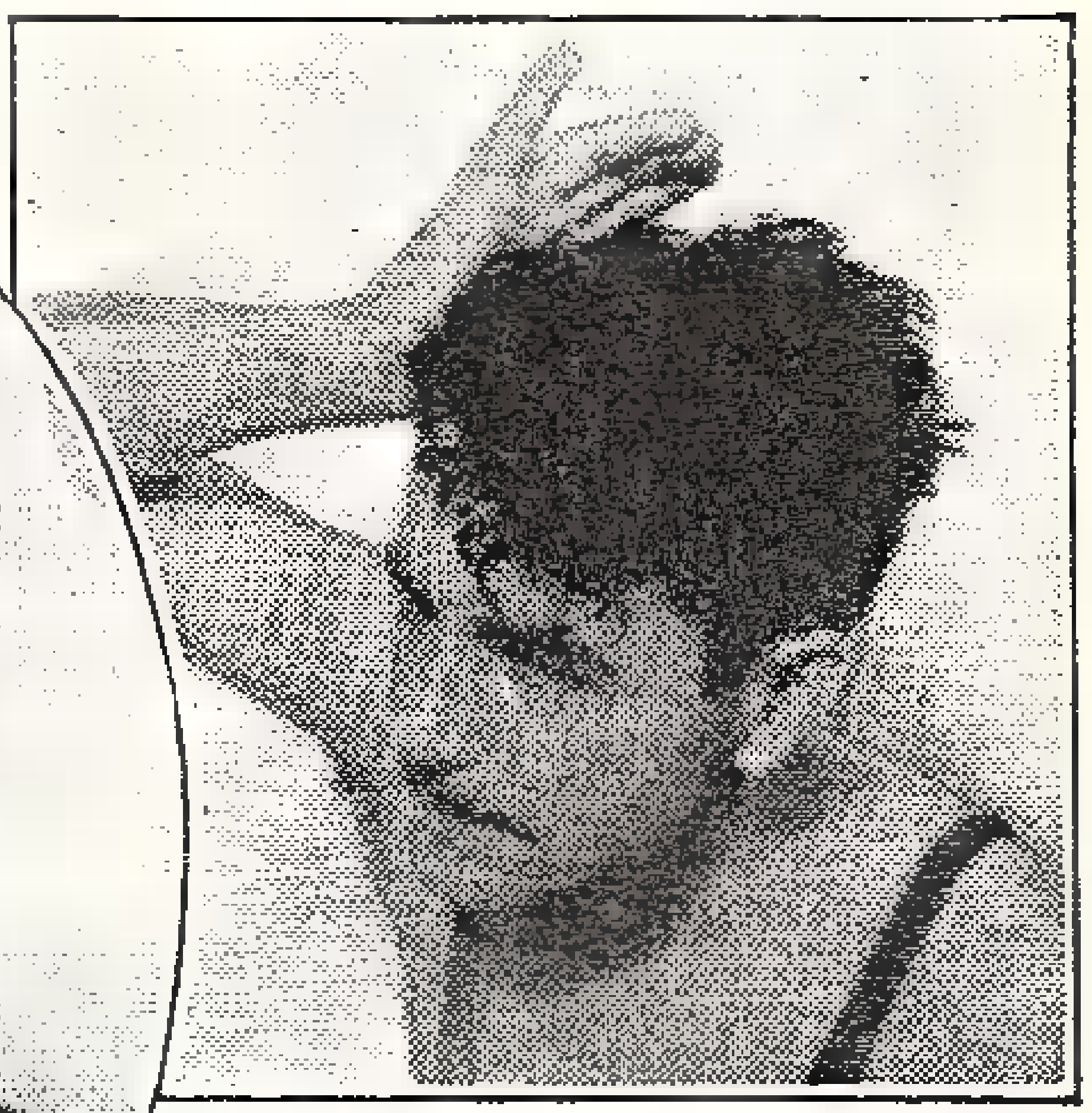
Aside from the coal burner in the rear, as illustrated in the photo above, the car resembles the standard article in most respects. It is the invention of J. A. MacDonald of Kenya, Africa, who claims that his invention will prove a keen competitor for the gas engine. The inventor is shown in the photo above filling the tank with a charge of fuel.

Strange Facts About the Way You Hear



Sounds made by vibrating tines of fork can be heard distinctly when handle is placed between teeth or against center of head as demonstrated here. Try the test as yourself.

The bone conduction test will prove that ears are not necessary for hearing. When fork sounds out, the vibrations will be heard best with the closed car. Right—Yawning disturbs the balance of air pressure inside and outside the ear drum and temporarily deafens the much bored person.



Pounding head as demonstrated here or blowing nose won't cure bather's deafness. Wise swimmers allow the water to drain away gradually.

TAKE any book on good manners. In it you will find a paragraph to the effect that if you must yawn, you should put your hand over your mouth. You'll find no statement to the effect that yawning also puts an invisible hand over your ears. Plainly put—you can't hear when you yawn.

The explanation is quite simple. In order to function properly, the air pressure on the inside of the "ear drum" must be the same as the air pressure on the outside. The outer pressure is usually constant; the inner air pressure is supplied by the eustachian tube—a little canal running from the back of the nose to each ear.

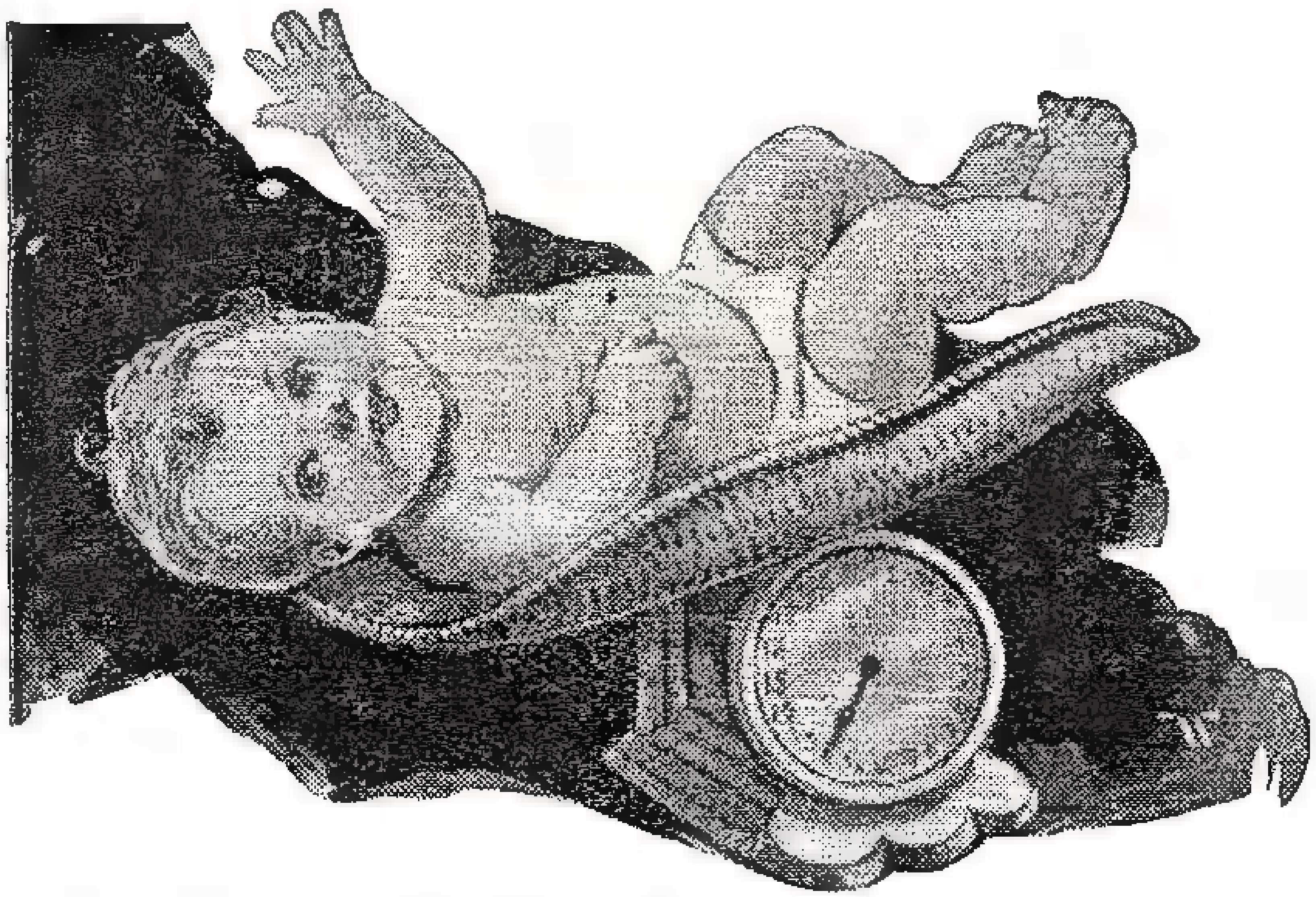
When you yawn, you are merely gulping in air. This sudden intake of air, accompanied by the sometimes terrific stretching of muscles controlling the eustachian tube, momentarily lowers the air pressure inside the ear. At a certain point during the course of the yawn, you will hear a little click . . . and . . . for a fraction of a second after, your power of hearing is considerably diminished.

Thousands of persons who go bathing each year and complain of a partial deafness because of water in the ears know nothing about it. They attribute the deafness and a general sense of fullness which may often be accompanied by head noises, to water which has entered the ear from the outside. Actually, the trouble is invariably on the inside of the drum. A forcible blowing of the nose, a common tendency with all bathers, carries irritating water to the inside of the drum, blocking the air channel and making hearing difficult. Wise bathers refrain from blowing, allowing the water to drain away gradually.

People are usually surprised to learn they can hear almost as well through bone conduction as air conduction. Try it! Gently snap the tines of a table fork so that it will produce a singing note. Hold the fork at any place along the center of your head. You will hear the sound quite plainly.

Sound conduction through the teeth is so excellent that many persons, ordinarily quite deaf, are able to enjoy concerts and the theater by simply gripping a vibratory bit of metal through the incisors. That the sound waves go directly to the "telephone" and are not carried over the "telephone line" can be easily tested by closing one ear with your forefinger while making the bone conduction test. If normal, the sound will be heard best in the closed ear.

1000 WAYS to MAKE a



Money-making ideas shown in these pages, which will appear each month in Modern Mechanix and Inventions until a thousand items have been printed, are contributed by readers who have found them life-savers in time of need, when income shrank through loss of job or other reasons. The first installment of these ideas appeared in the March issue.

Renting Baby Scales

IN GOOD sized communities money can be made through establishment of a baby scales rental service. You can either purchase scales or arrange with a hardware or scales store to use used scales for such service. The common rental price is from $4 to $5 for a six months' period. One woman in a city of 250,000 population has seventy-five sets of scales in such service steadily. Frequently sales of scales can be made at a commission, or profit if you own the scales, when the rental period expires. Customers can be found easily by daily watching of the "births" column in the daily paper and use of postal cards or telephone a very few days after appearance of the announcement.

Home Library Service

A MIDDLE aged woman who had had a flourishing tutoring business in French found herself with curtailed clientele as the depression wore on. With her knowledge of books and library work, she impressed upon her well-to-do friends the advisability of culling their libraries and selling off the undesirable, trashy type of thing, preserving in their libraries the kind of books one would like to see there. She explained that she would make either linoleum or zinc bookplates, placing them in each volume for the owner to sign. The books that were undesirable were placed in rental libraries and others were sold, helping defray her fee, which was ten dollars for refurbishing the average home library.

Novel Advertising Stunt

A YOUNG man with originality conceived the idea of a brand new advertising medium. He rented a vacant store on a well-traveled street of his home city, then rented out space on the walls to customers who wished to advertise property or services for sale. This was done in the form of signs of uniform size, some 18 inches square. As the idea caught on, the proprietor acted as agent in bringing advertiser and customer together, securing a commission when a deal was completed.

"Magicking" for Money

A CIVIL engineer whose firm shut down purchased two books on Magic and began to practice magician's tricks on his friends. He practiced until he had a number of tricks suitable for an hour's entertainment, when he began to charge for his act. Clubs, schools, luncheons and lodges he found good prospects for his services, and as his fame became known within his village, he found no difficulty obtaining bookings which bring him more money than the job he lost.

Door Repairs Bring Honest Dollars

IT IS rare that a house does not have at least one door that is giving trouble, either through sagging or warping. A little kit of tools thrown over the back and a call from house to house agreeing to repair such doors for one dollar apiece will develop business.

The repair kit does not need to go beyond a few screws, a driver, a plane, a hammer, etc. Sometimes the mere use of a plane, other times the replacing of a hinge, will solve the problem.

Most houses have sagging doors that annoy the occupants. A plane and a few tools make repairs at a dollar per door.

LIVING

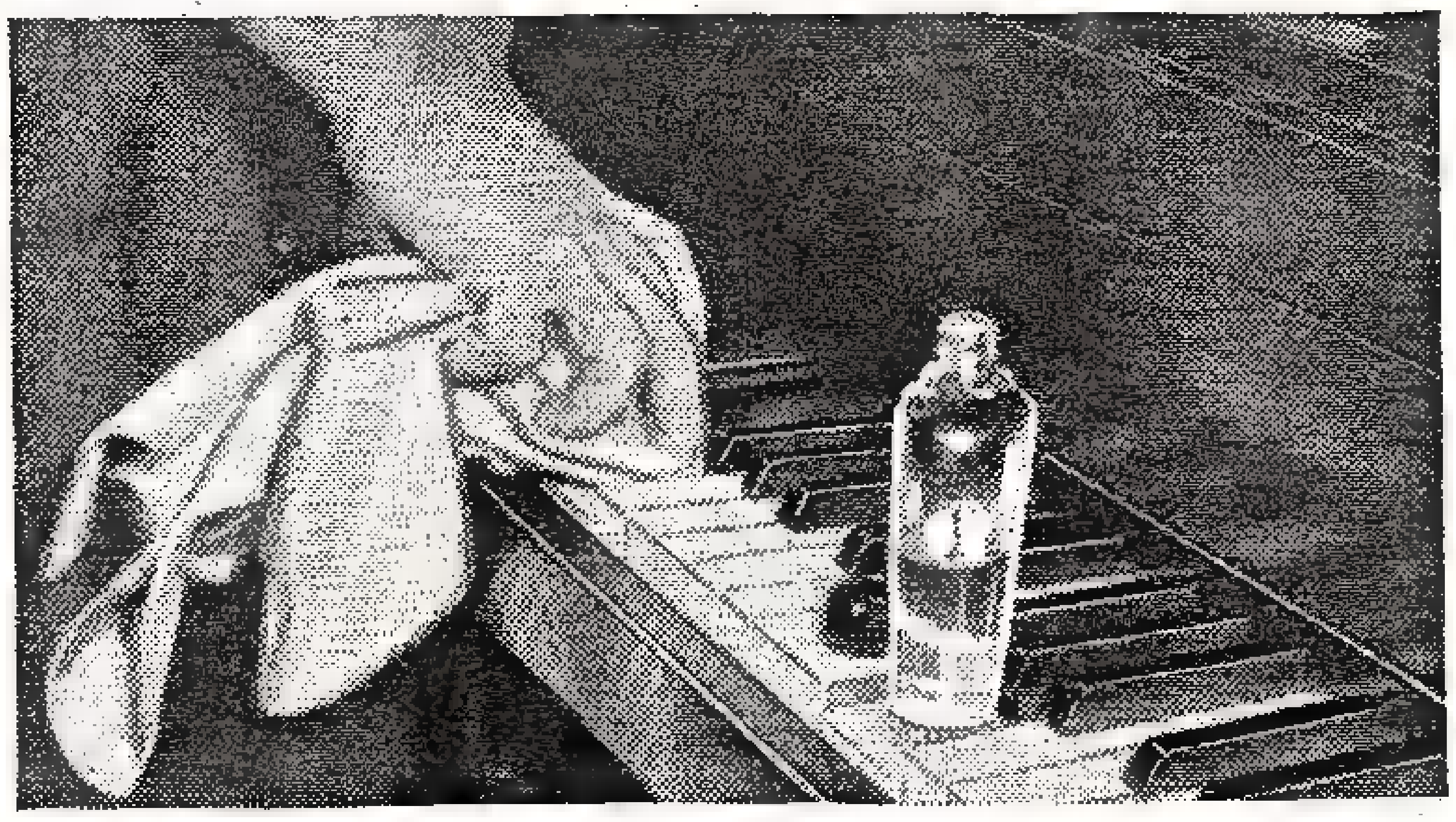
Grocers Welcome This

A MAN who had not been able to secure a job for some time hit upon this novel idea for making a living, and now would not have his old job back. He checked the telephone directory with city directory and listed the names of people without a telephone. He took this list to a prominent grocery store and the manager checked the list with his list of customers, finding, of course, that only a small number of these people were trading with him. My friend then got a job calling on these people daily soliciting business for the grocery store on a percentage basis. He got the surprise of his life at the amount of business received and the grovery store was equally surprised at the new customers on the list at the end of the month. He is now calling on his daily trade for his orders in the morning and, having increased the business at the store, is working evenings and rush days at extra pay.

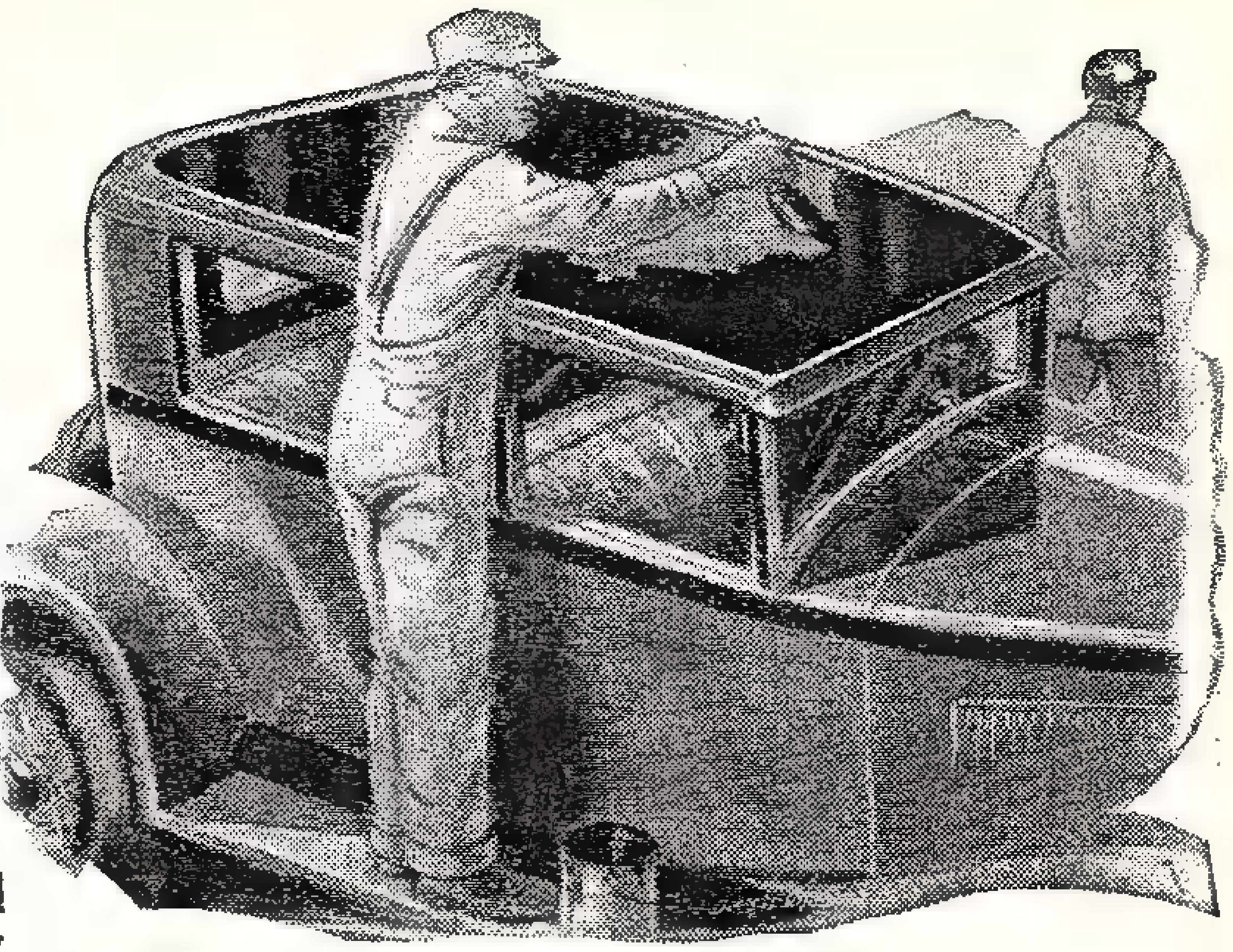
Money in Piano Cleaning

IF a mechanic will examine a formula book at any library he will find a preparation that will turn piano keys back to the original white lustre. This can be made the basis of a little business, for the keys cannot only be whitened, but the mechanic can also clean and moth-proof a piano with little additional expense and get a round figure for the whole job. Each job should be done for about three dollars and it will be found that about a half day will be required to do a really fine piece of work. Dust should be brushed out with small brushes, moth-proofing liquid should be sprayed in with a small hand sprayer, and a film of light oil should be placed on the strings and over exposed metal points like the pegs to prevent further rust. When the housewife looks at her nice new and clean keys, she will be more than willing to pay the price. If she only wants the keys restored, that should cost her a dollar.

This stunt can be worked in cooperation with piano tuners who can put you next to live prospects for cleaning service.



Any formula book gives a recipe for a piano key cleaning fluid, costing very little, so that jobs are mostly profit.



Auto Top Refinishing

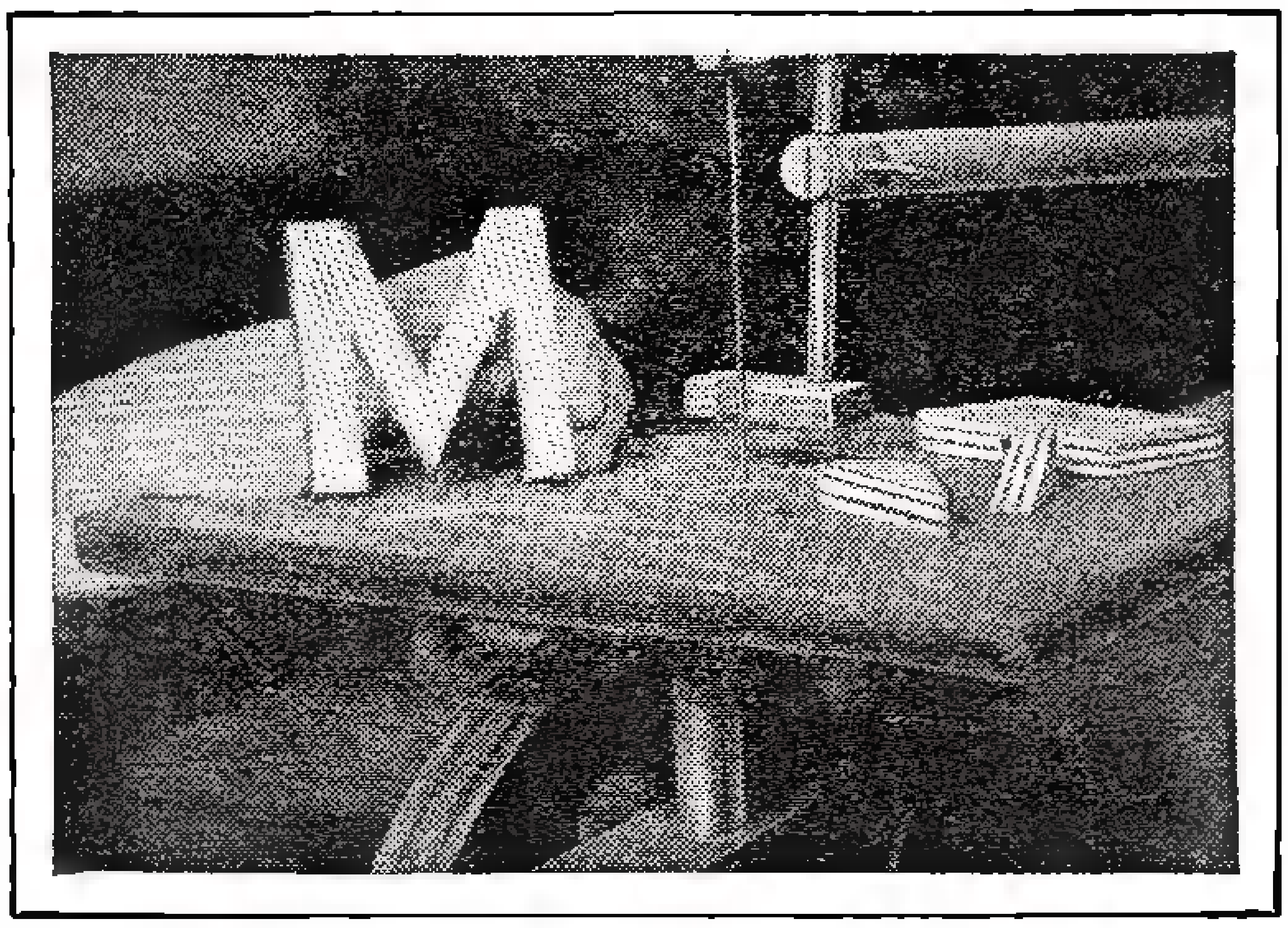
A PAINTER thrown out of employment now makes a good living refinishing auto tops. He stations himself near a parking lot, or any spot where cars stop for a few minutes, and offers to refinish dingy tops for 25c, 35c or a dollar, depending on the area to be covered. All he has to carry with him is a brush and a can of black top dressing. Psychology works in his favor because the average car driver won't take the trouble to drive into a paint shop to have his car top refinished, but will be glad to have the job done without troubling him while he goes on about his business.

For Radio Men

A YOUNG fellow trained in radio who lived in New York recently developed a phase of business that brought him many dollars and was never even dreamed of by his competitors. This young man canvassed the brokerage offices of the city and told them how nice it would be to have a public address system in each office so that special news bulletins received on the news tickers could be read off to all of the customers in the trading rooms. Within the space of a few months, this young man had made seven installations, one of them running into several thousand dollars. As a matter of fact, he made money much faster than he had ever made it repairing and selling radio receivers. Yet he did nothing that the average fellow interested n radio cannot do. Even in the smaller cities nowadays there often are as many as ten or fifteen brokers.

Coal Orders

A PROFITABLE, though seasonal, occupation, but one needing no investment, was devised by a former mill superintendent, out of a job. He capitalized on his wide acquaintance and long standing in the community to solicit coal orders on commission and a flashing neon sign in the window of his home informed the public that even though it was a residence "Coal Orders Are Taken Here." The idea can be applied to other commodities to eliminate the seasonal angle.



Block Letter Signs

BLOCK letter signs during the past few years have become almost as popular as neon signs for advertising. Several mechanics living in the larger cities have turned their jig-saw to good use to supply local merchants with such signs intended for window and outdoor use. The letters made this way are more attractive, last longer and can be repainted by an inexperienced person. Those who want to try this business should get a book on lettering at the local library and make a set of tin patterns for permanent use. Only the most simple square cut letters should be chosen. Such simple block signs sell anywhere from $5.00 to $50.00, depending upon the size, the number of letters and the number of colors. It makes a fine business for the careful mechanic and there is 70% profit in it.

Dignified Junk Yard

STEEL scrap has become a standard commodity these last two years. Prices range from $8 to $9 per ton. The energetic young men who is not afraid of his pride can quickly collect a ton of scrap by calling on garages and loading up at their back-door junk piles. One South Dakota boy made the rounds of neighboring towns and soon gathered better than $150 worth which he consigned to a regular Chicago clearing house, shipping an entire carload. Addresses of steel scrap buyers will be furnished by any iron trade paper.

Fish Provide Pocket Money

MANY boys and men make a profit fishing in season by selling their strings of fresh fish direct to Jewish families. Hebrews who know the fisherman and know he brings his catch direct from a hole through the ice or from open water will often prove to be regular customers due to the fact that no formalities are required where fresh fish are concerned. The fisherman must be sure, however, that he is not violating any laws concerning sale of game fish. Certain lakes are available for commercial fishing in season; information will be supplied by game and fish commission.

Funds for College

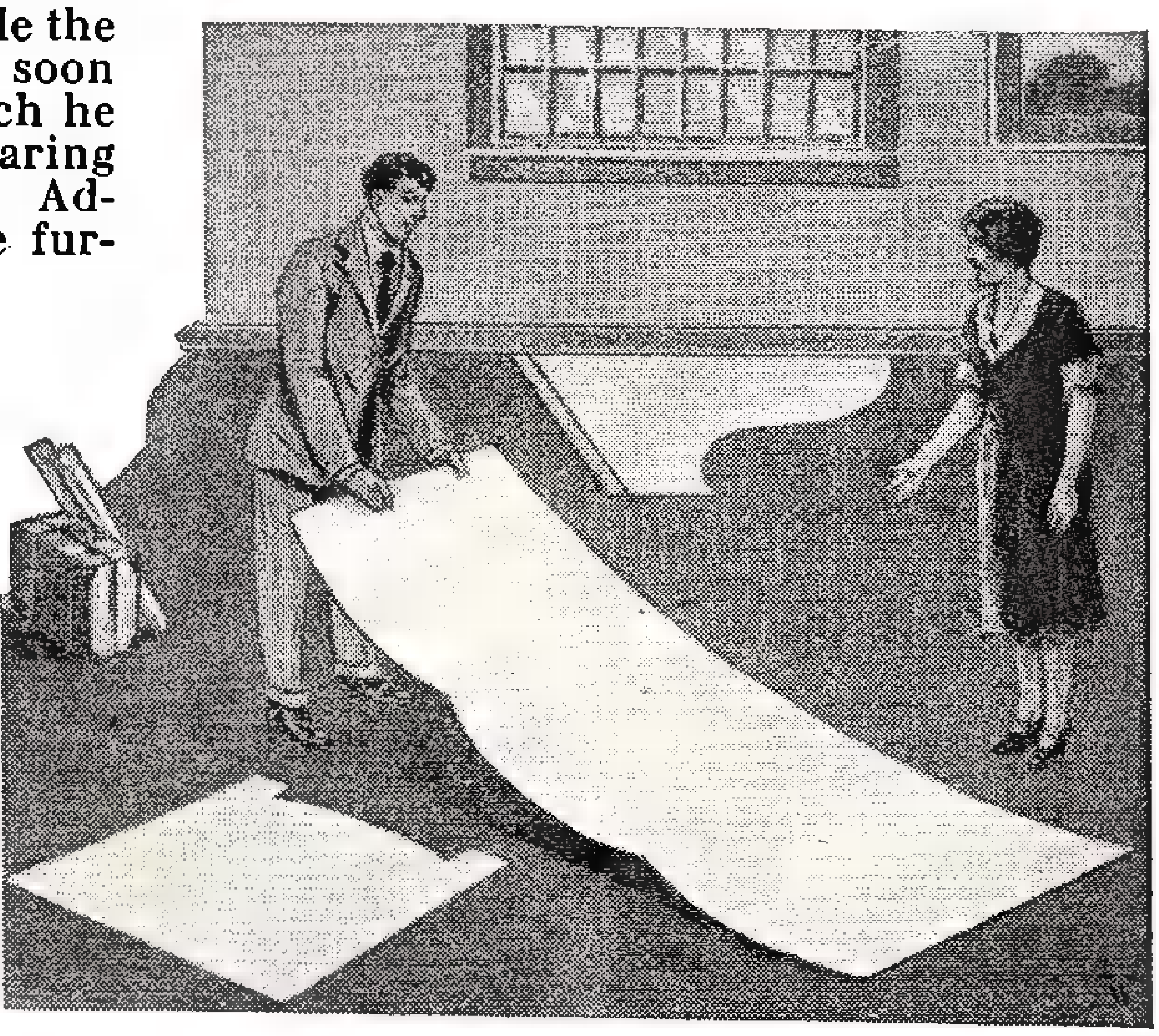
A COLLEGE student unable to find summer employment, cast about for ways and means to finance his next year at school. He had been a Boy Scout for a number of years and was accustomed to handling younger boys. He made a canvass of one of the best residential districts in his city and had little difficulty in forming a group of boys from eight to ten years of age, whose mothers were willing to take their turn in providing transportation and lunch for the group. He had charge of the boys from nine to five each day, taking them on hikes, picnics, etc., and also taught them swimming and outdoor games. The small charge per boy per day enabled him to save enough during the summer months to more than meet his college expenses.

Auto Washing Business

ALL that is needed to go into the auto washing business is a supply of water and elbow grease. Soap and a sponge involve very little capital, and a high school boy who was willing to work found that he could strike up a very good business with owners who had dismissed their chauffeurs, but who were still keeping their cars in their own garage. Charging but half of the amount usually asked by elaborately equipped garages, he was able to make $12 a week this way.

Furniture Pattern Service

A CRIPPLED boy in a large city devised a way to increase sales for furniture stores. He agreed to cut out paper patterns at ten cents apiece for any object of furniture in the store. Thus a prospect who entered the store was later mailed a floor plan of a grand piano, or a davenport, or a chaise lounge. The prospect found himself moving furniture about his home, re-arranging this and that, until he had imagined



Paper models of grand pianos and other articles of furniture help to sell them. One youth makes a living cutting out such pieces for 10c each.

himself the owner of the piano or davenport or chair. Selling then was an easy matter. Several dollars a day were made by the youth, who took his plan from store to store as the sales were put on.

Emergency Fix-it Service

MOST women are not mechanically minded. Taking advantage of this fact, one city high school youth runs a 30-cent ad in the local paper, announcing a wire fixing, radio repairing and furnace tinkering service for the busy housewife. He calls anywhere after school for 25c cents a call, plus carfare, fixing anything of a mechanical nature, such as blown fuses, broken locks, etc., at 25 cents an item.

For Draftsmen

HAVING had several years of experience as draftsman in various lines, but being temporarily unemployed, a young man in San Francisco made a canvass of the manufacturing plants and machine shops which had laid off their drafting departments. He found that while these firms hadn't enough work to warrant keeping a draftsman of their own, they were glad of the opportunity of getting drafting done as the need arose. His drawing board set up in his own room was all the office he needed and the idea worked out to the advantage of all concerned.

Curb Service Stand

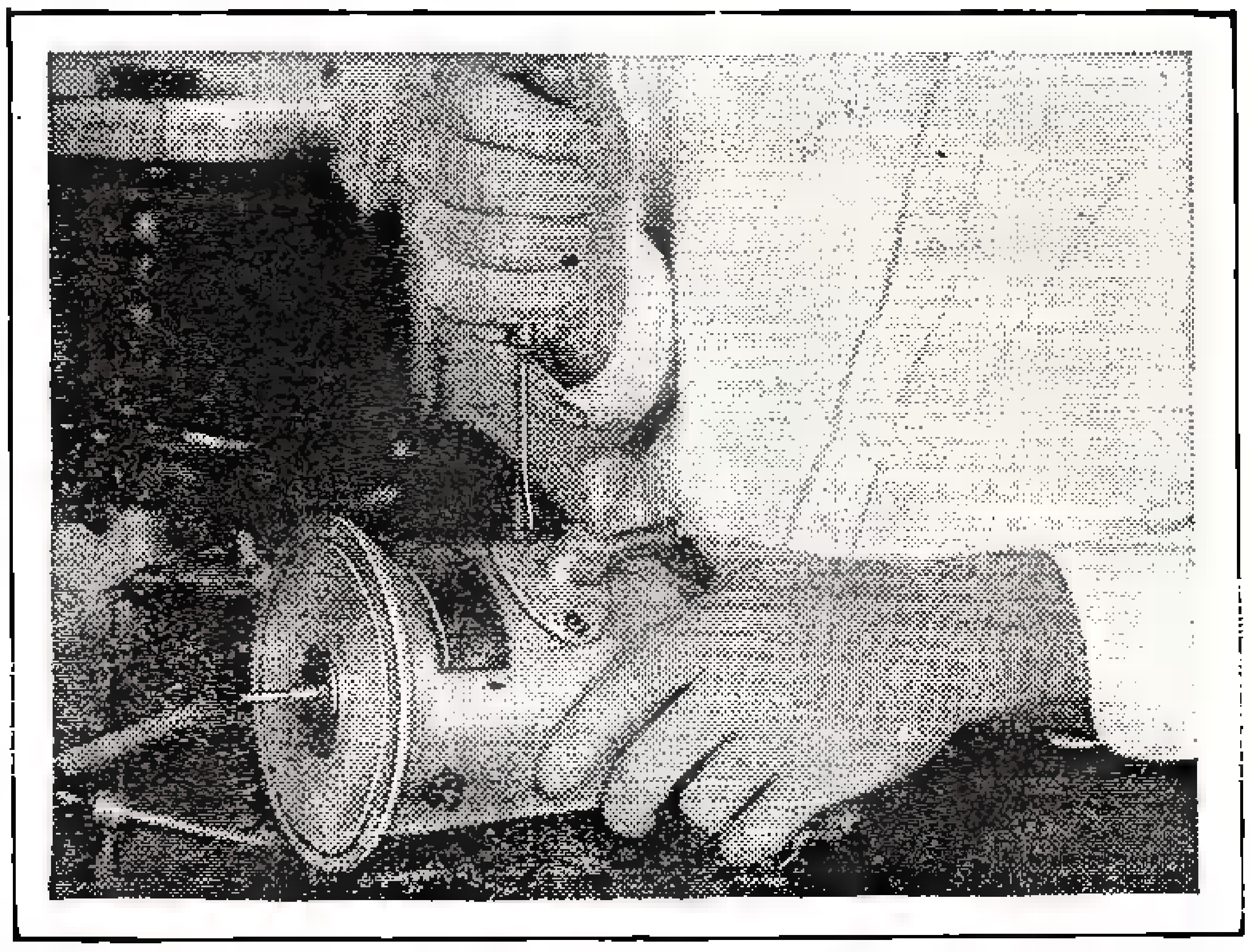
MOST roadside eateries are languishing. Last summer a college boy set up a shanty at a busy intersection where cars had to slow down, and blazoned his shack with big signs:

"CLEAN CURB SERVICE"
Hamburger on Bun—Toot Once
With Coca-Cola—Toot Twice
WE COME RUNNING

Motorists who would otherwise be too hurried to stop can drive up to this cleanly kept shack, make their wants known with their horn, and receive a hot hamburger and a drink at standard prices. Buns cost him ten cents a dozen, and fifteen cents worth of hamburger makes fifteen sandwiches. His profit was liberal and he made from three to four dollars a night on fairly busy nights.

Summer Lawn Service

MANY people who formerly kept a caretaker wish to leave their town homes for the summer, vacationing at their lake homes. To a group of people like this, one enterprising young college man explained that he would, for five dollars a month per place, keep the lawn trimmed and the hedges cared for and watered. He was successful in lining up 32 dwellings in the better residential districts of the city, and found he could just about make the rounds once a month. This gave him a fine summer income.



Renovating Vacuum Cleaners

OVER 5,000,000 vacuum cleaners are in use in the United States today and over half of these are old and antiquated. Not too old, however, to be restored to many years of usefulness by clever mechanics who know how to take up bearings, clean commutators and replace old worn cords. For about three dollars a good mechanic can afford to spend a half a day on such jobs and with this time put in he can do a really fine job if he has any shop equipment at all. The vacuum cleaner can be returned in excellent shape. A nice piece of psychology to use in this business is to tell the lady that it is desired to buy her old vacuum cleaner for re-building and resale. That will make her want it fixed.

Training of Servants

AN INVALID woman, virtually bedridden in a large house, finding herself penniless, remembered that her friends had always admired the perfection of the household servants she had had in better days. Realizing that her own training had wrought this perfection, she offered free training to girls who would pay a few dollars board for a week or two, then arranged with her friends to pay her the amount of weekly wages they would ordinarily have paid while training the servants themselves. Thus she obtained constant complete service for herself and a modest income, and was soon able to promise each girl student a good position when her training course of one month was completed.

(Continued on page 143)

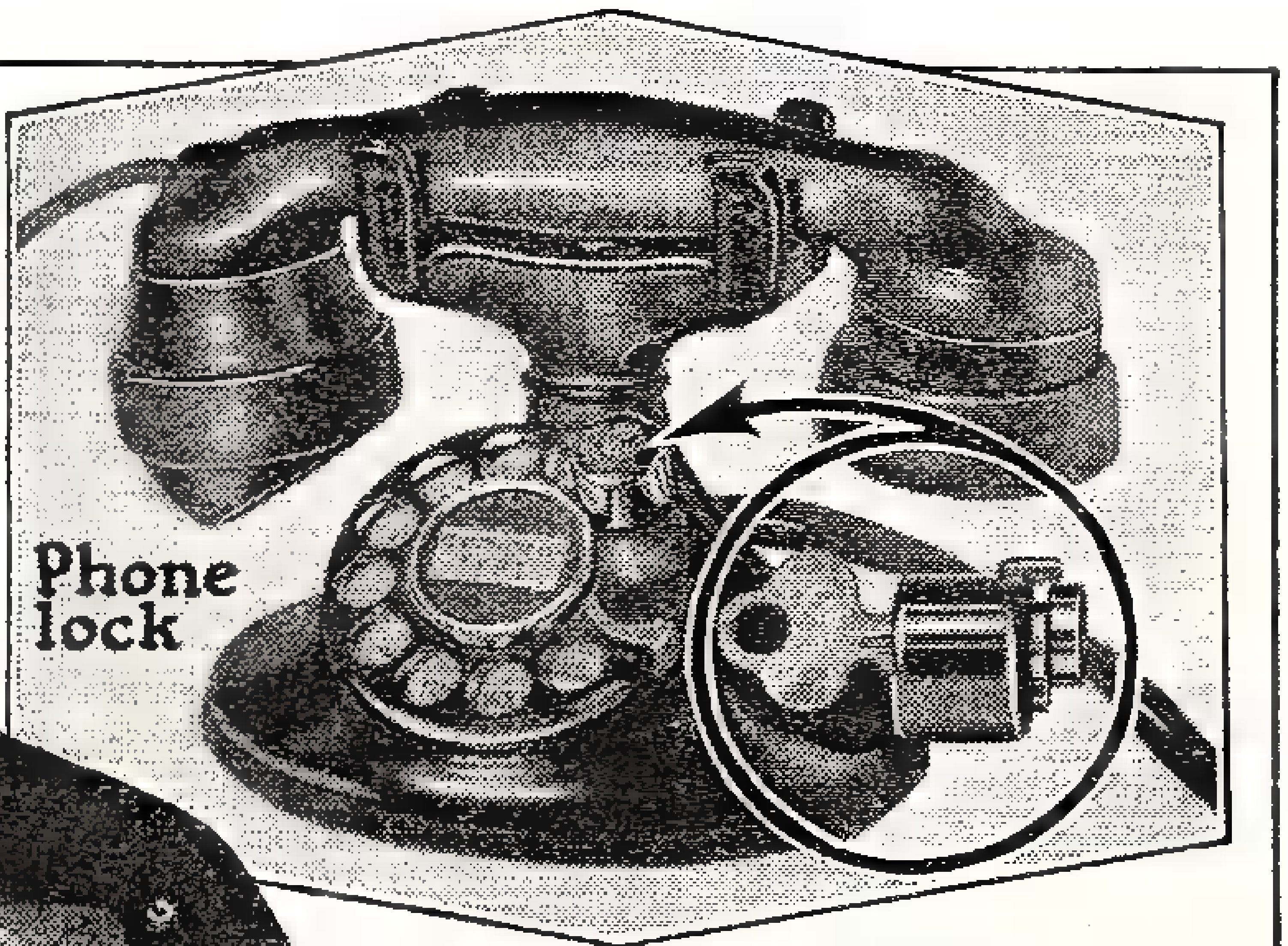
CASH FOR MONEY-MAKING IDEAS!

Have you worked out some ingenious, practical way of making money, either as a full-time job or a spare time activity? Perhaps some friend or neighbor, thrown out of work, has used his wits to devise some money-making scheme which brings better returns than the job he lost—this very thing has happened so often recently that many men look on depression as a blessing in disguise. For all accounts used in this money-making department of the magazine, payment will be made at regular rates. Here's your chance to become an author! Keep your article brief, and address it to Modern Mechanix and Inventions, 529 S. Seventh Street, Minneapolis, Minn.

New INVENTIONS Remove

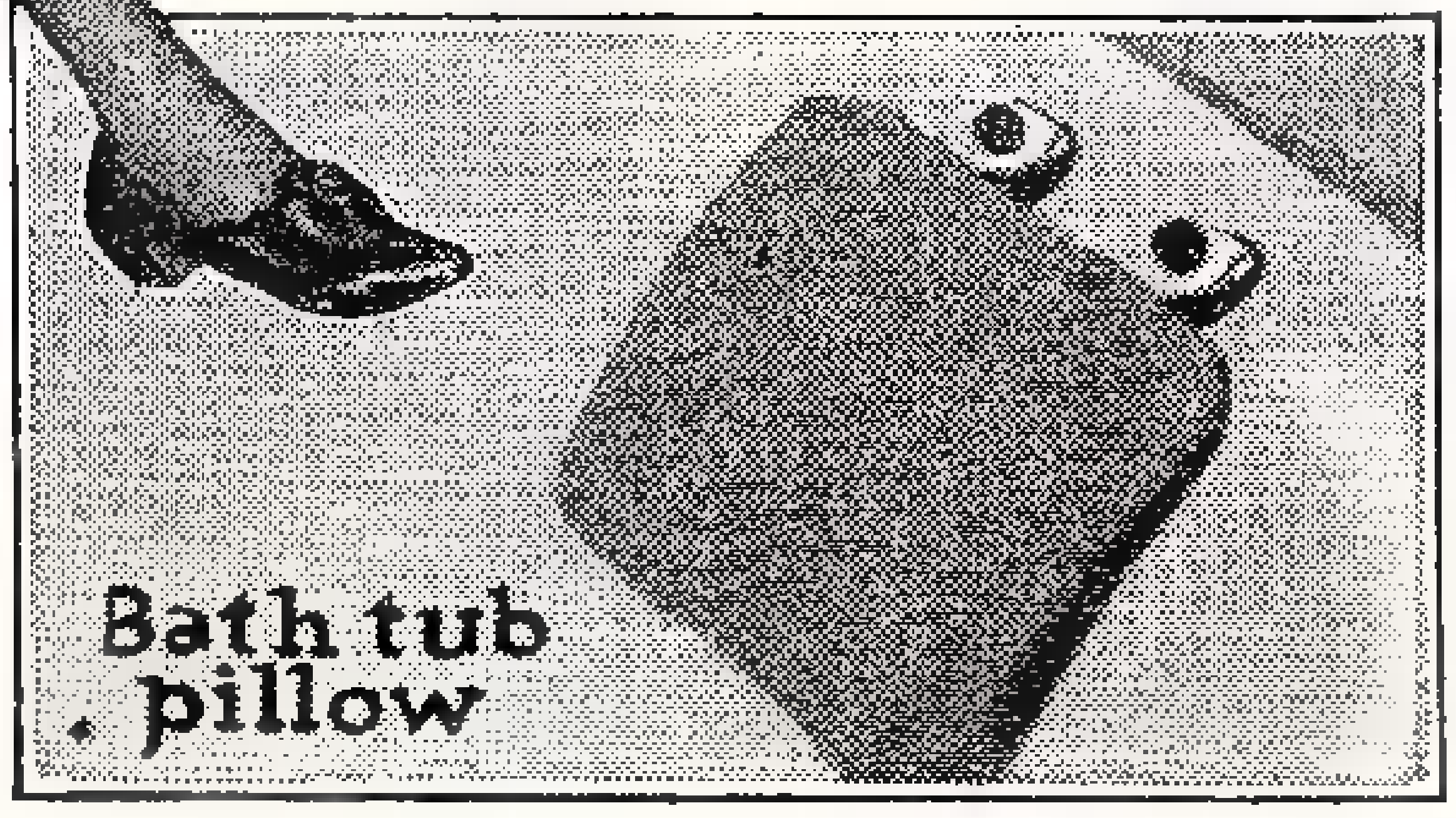
Arm-chair radio

Radio tuning dials are at your finger tips as you sit in this new easy chair which has broadcast set built into arm.



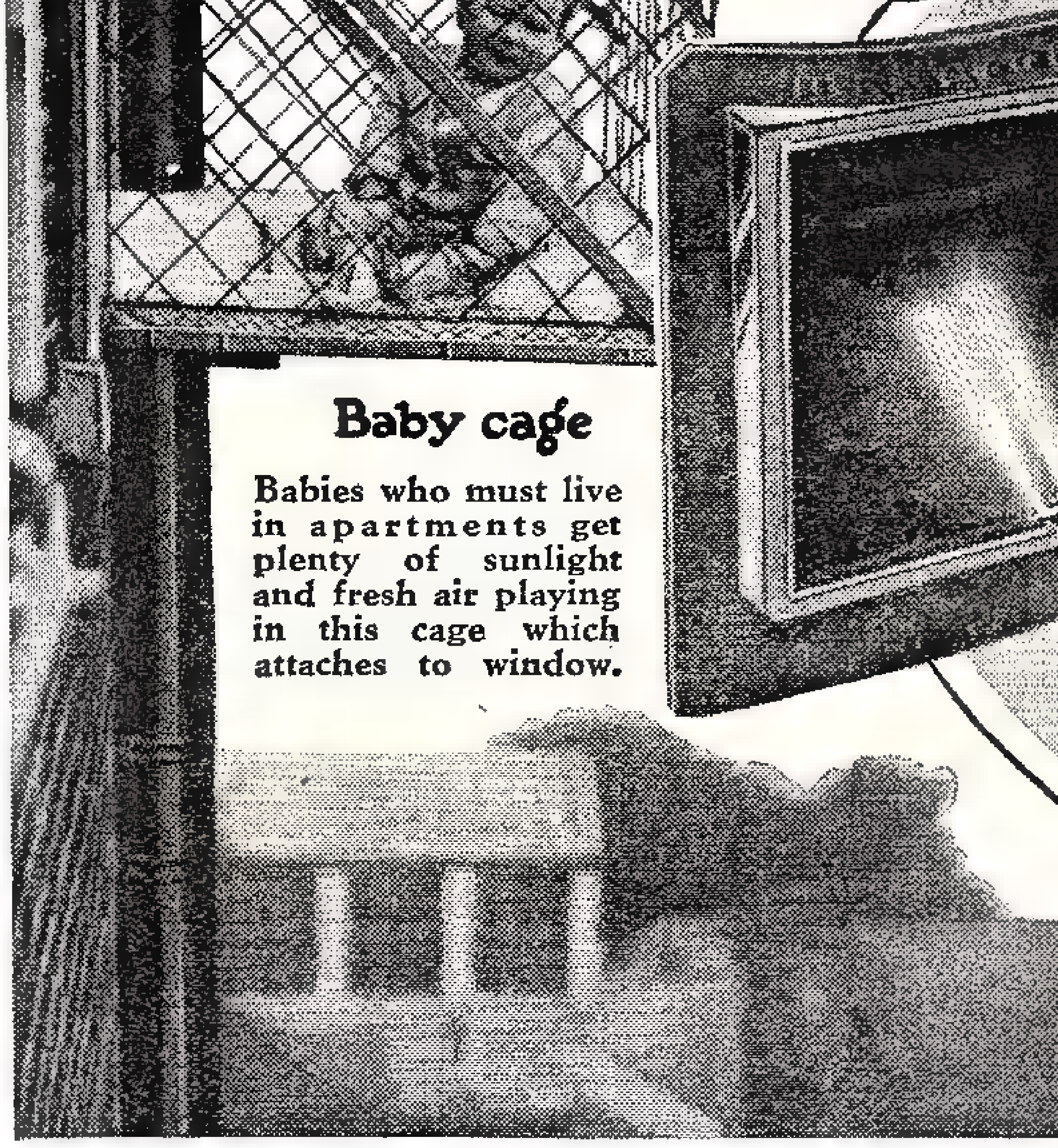
Phone lock

Unauthorized phone calls cannot be made from phones equipped with the dial lock shown above. The lock does not interfere with incoming calls.



Bath tub pillow

Rubber pillow attachable to bath tub with suction cups permits you to recline comfortably.



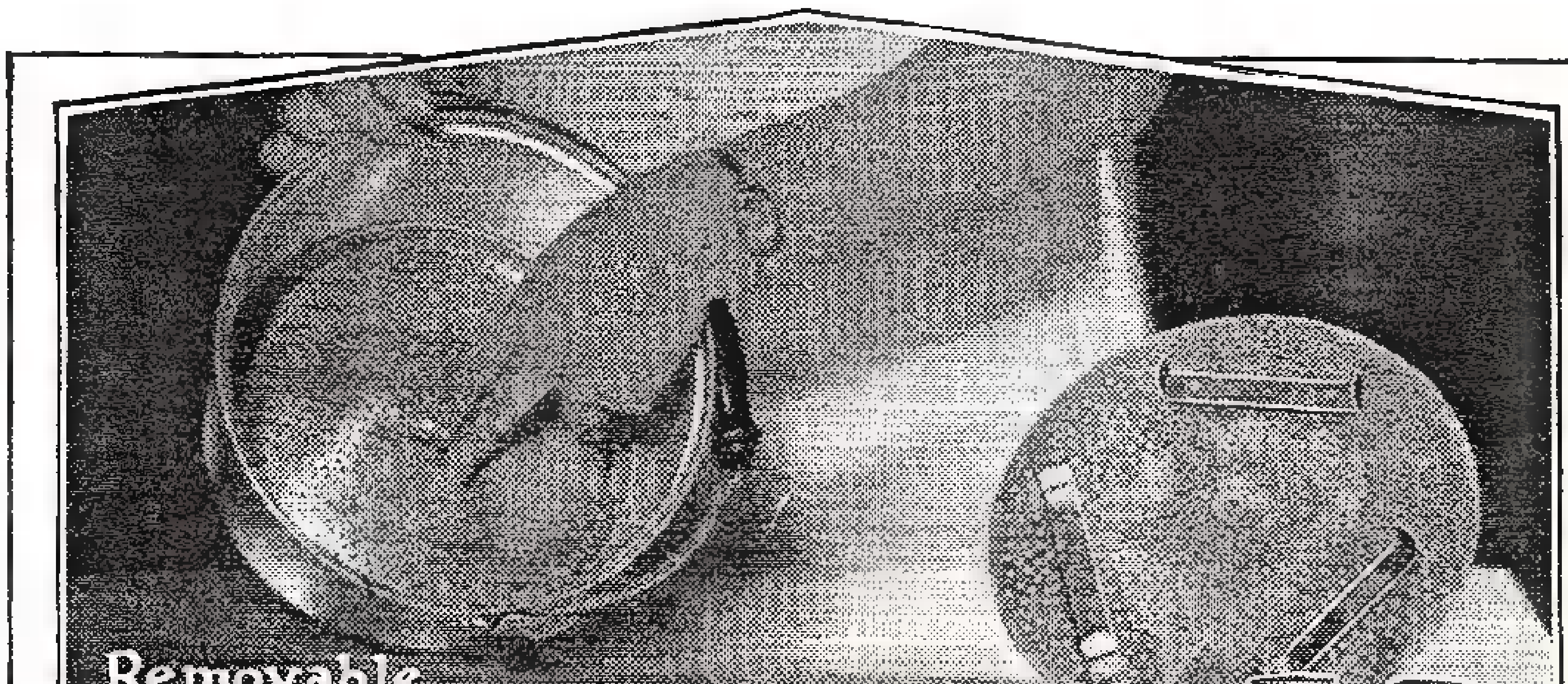
Baby cage

Babies who must live in apartments get plenty of sunlight and fresh air playing in this cage which attaches to window.

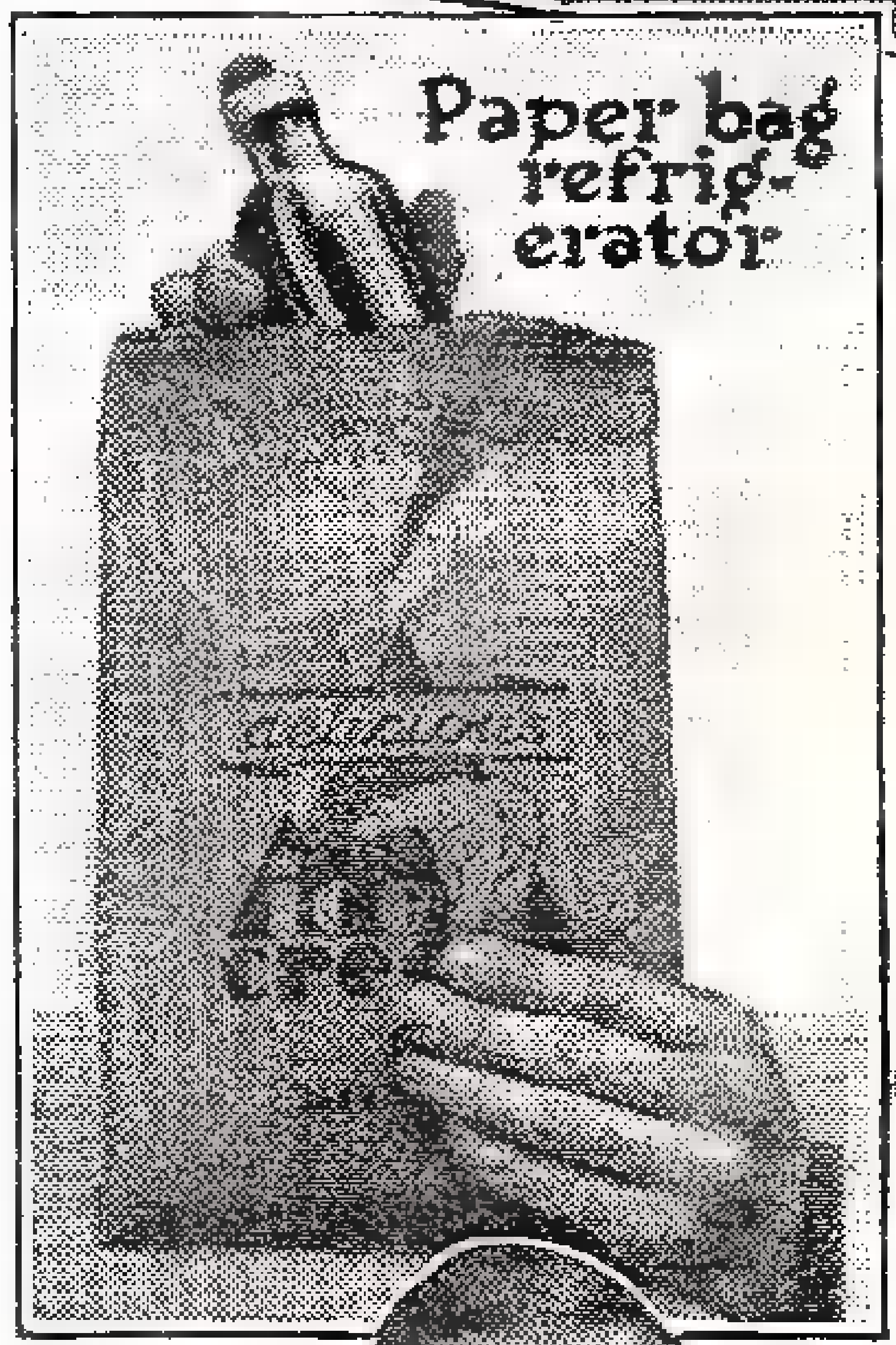
Furnace cleaner

New gas attachment which is lighted and burned but a few minutes and then removed makes furnace lighting clean, easy and quick procedure. Does away with kindling and saves coal.

LABOR *from Housekeeping*

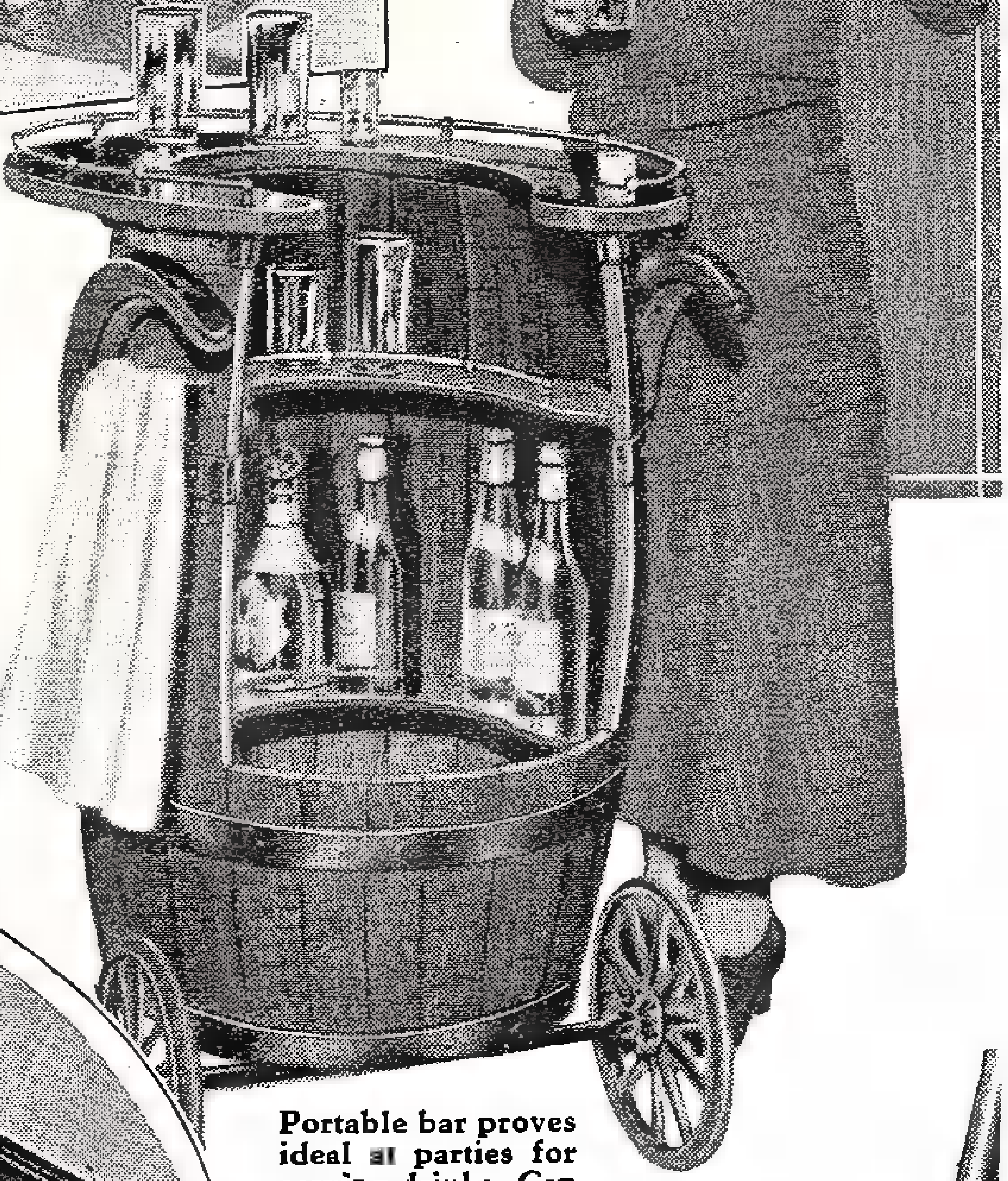


Removable pan-bottom



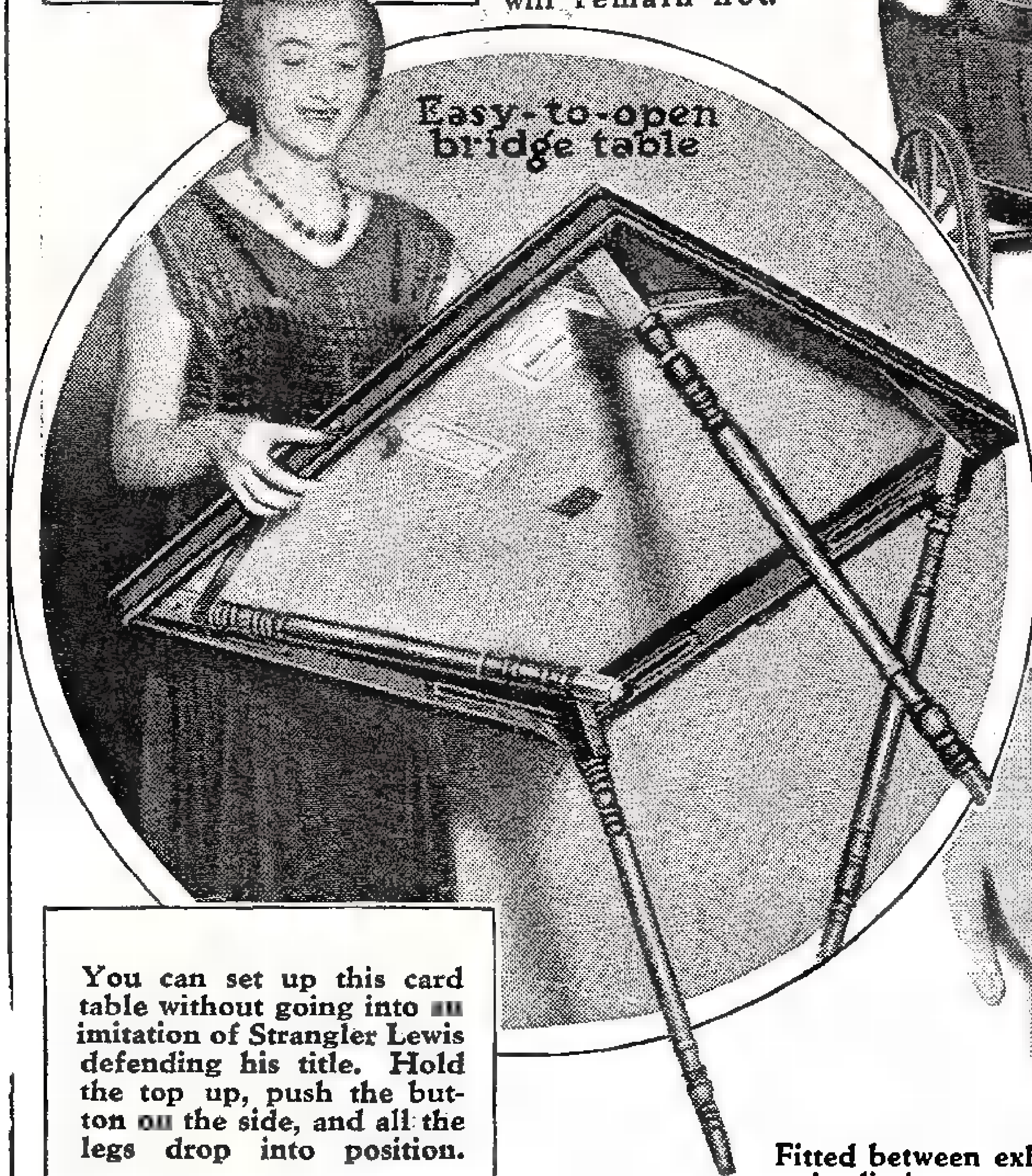
Paper bag refrigerator

New removable pan bottom, ideal for cooking vegetables, spaghetti, stews, etc., prevents the foods from sticking to the bottom and is easy to wash. Left—Triple-walled paper bag with an insulating substance packed between the walls maintains the temperature of an article contained within it at constant level for an hour or more. Ice cream will stay frozen, coffee will remain hot.



Portable bar

Portable bar proves ideal at parties for serving drinks. Can be easily moved any place with handles and wheels.



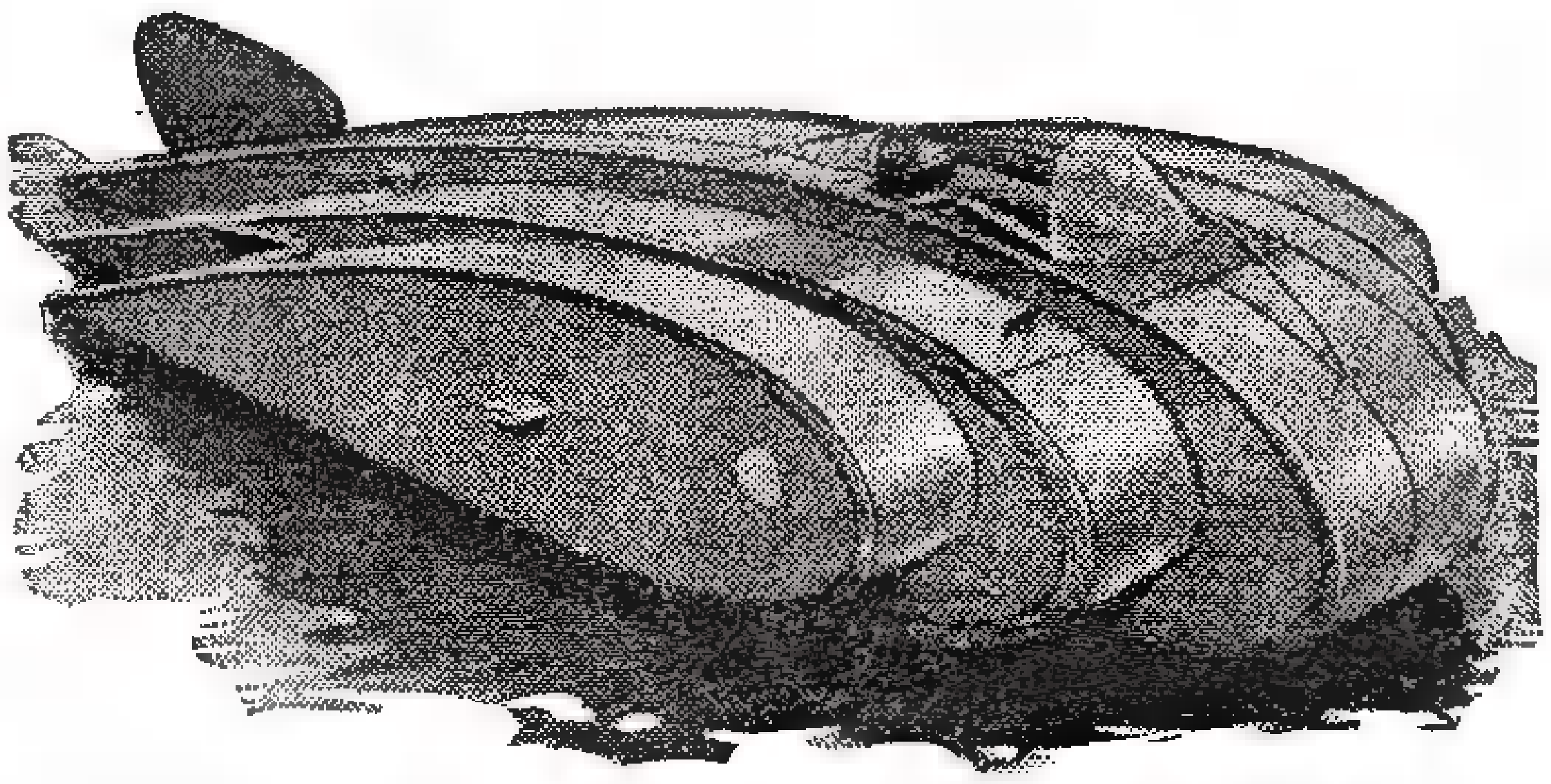
Easy-to-open bridge table

You can set up this card table without going into an imitation of Strangler Lewis defending his title. Hold the top up, push the button on the side, and all the legs drop into position.

Dust collector

Fitted between exhaust of fan and bottom of bag, dust collecting unit eliminates unpleasant task of emptying vacuum cleaner bag.

Airfoil Shaped Hull Gives Boat Maximum Riding Comfort



When aero-hydro craft reaches high speed, airfoil shaped wings lift hull off water, assuring smooth riding comfort.

THE last word in speed and smooth riding is provided in a new boat of radical design which literally flies over the surface of the water.

What does duty for a hull is a series of airfoil shaped sections placed in graduated and step-like fashion up and down from a central section. These sections act as wing surface and under high speed eliminate water drag and so lighten the weight of the hull that extremely high speeds are obtainable.

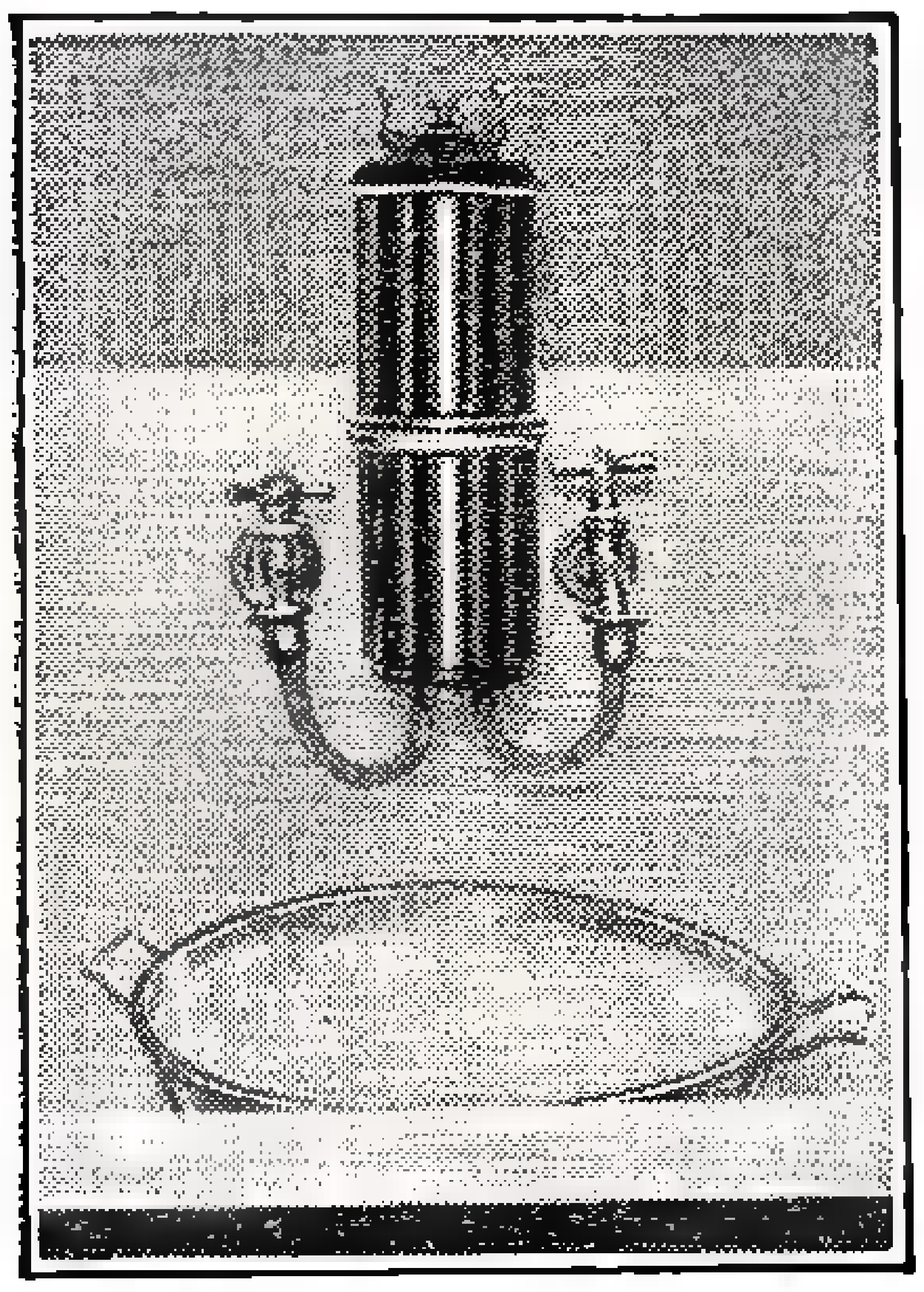
When high speed is attained with the craft these wings also contribute to the lift so that the hull, with the exception of a small area in the center, is free of the water, the craft riding on a compressed air cushion at the speed of an arrow.

The propeller is located about one-third of the way back from the bow of the boat. An air rudder steers at high speed, a water rudder at low speeds.

The craft, which is the invention of Victor W. Strode, of Portland, Oregon, proved its practicability in successful trial runs in Marshfield, Oregon.

Softener for Hot or Cold Water

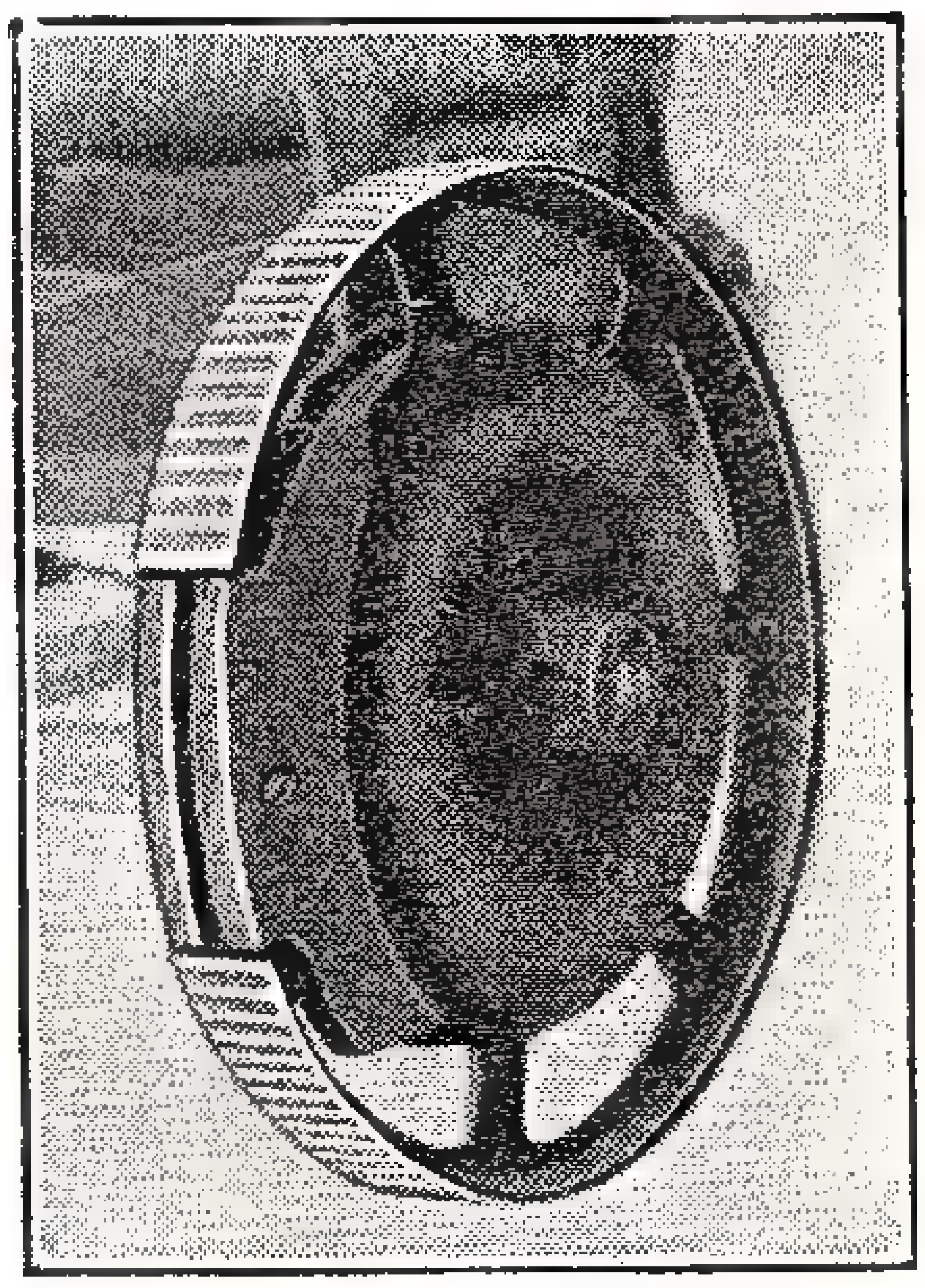
HOT or cold soft water is instantly available when using this new water softening tank, which is supported out of the way by a bracket over the sink, washstand, or bath tub, as illustrated in accompanying photo. The water softening chemical is sealed within and lasts indefinitely. It is kept up to strength by simply filling it with salt water and permitting it to stand over night. Two short hose connect the faucets with the tank.



Softening tank attaches to hot and cold water faucets as shown.

Repair Broken Lawn Mower Wheel

DOES your lawn mower need a new wheel before it can be put into use this spring? If a section is broken out it can be repaired by cutting a couple of pieces of plywood to shape that will fit the broken segment, as illustrated in the accompanying photo. When the two pieces are clamped into place with a stove bolt the machine will run as smoothly as ever, and will withstand admirably the hardest use. If your mower has some rough territory to negotiate, you might add an extra layer of plywood, bolting it down firmly. This, however, is only intended to serve till you can get the wheel replaced with a new one.

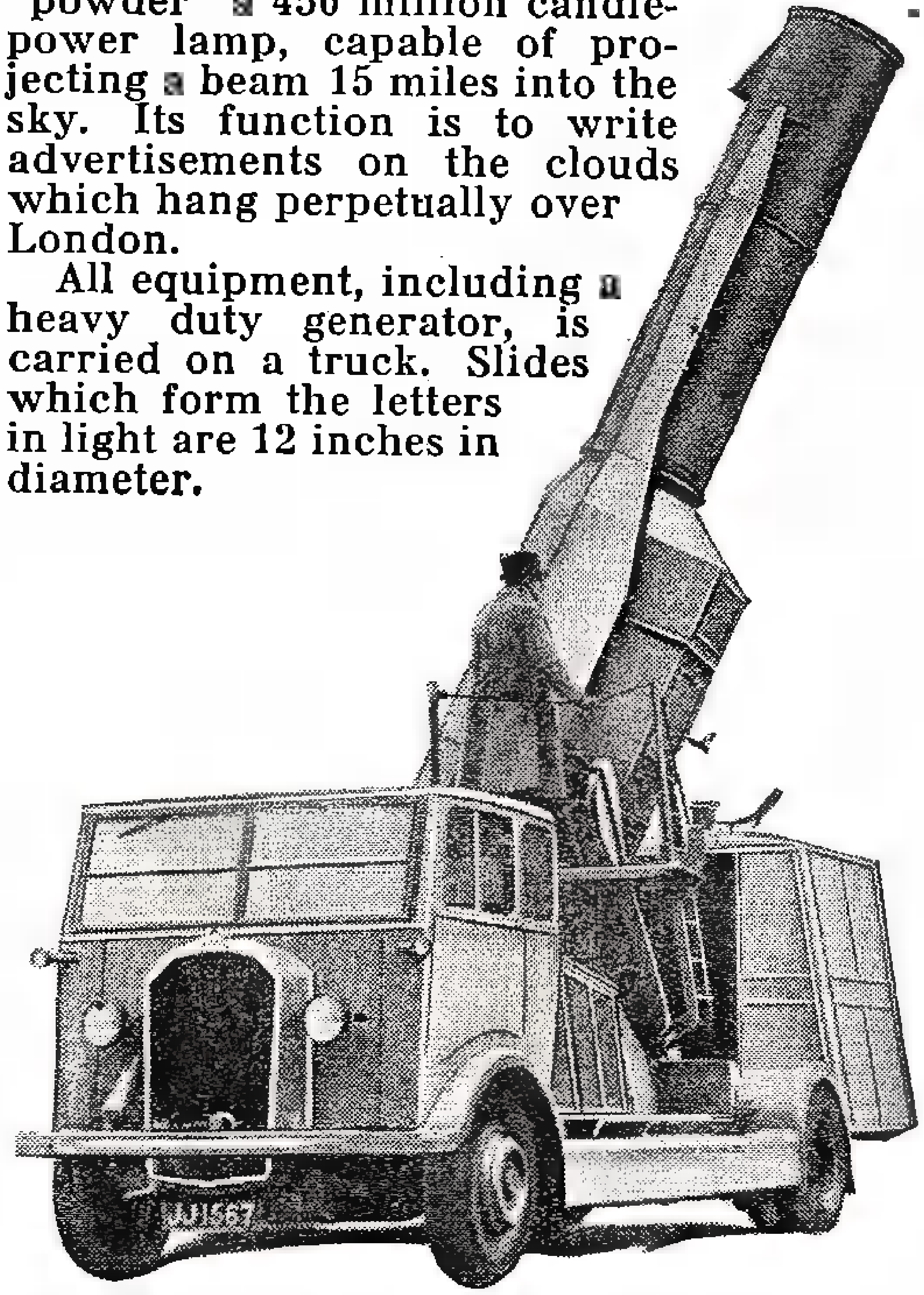


Shape plywood to fit the broken segments of the mower wheel.

"Gun" Shoots Cloud Ads 15 Miles

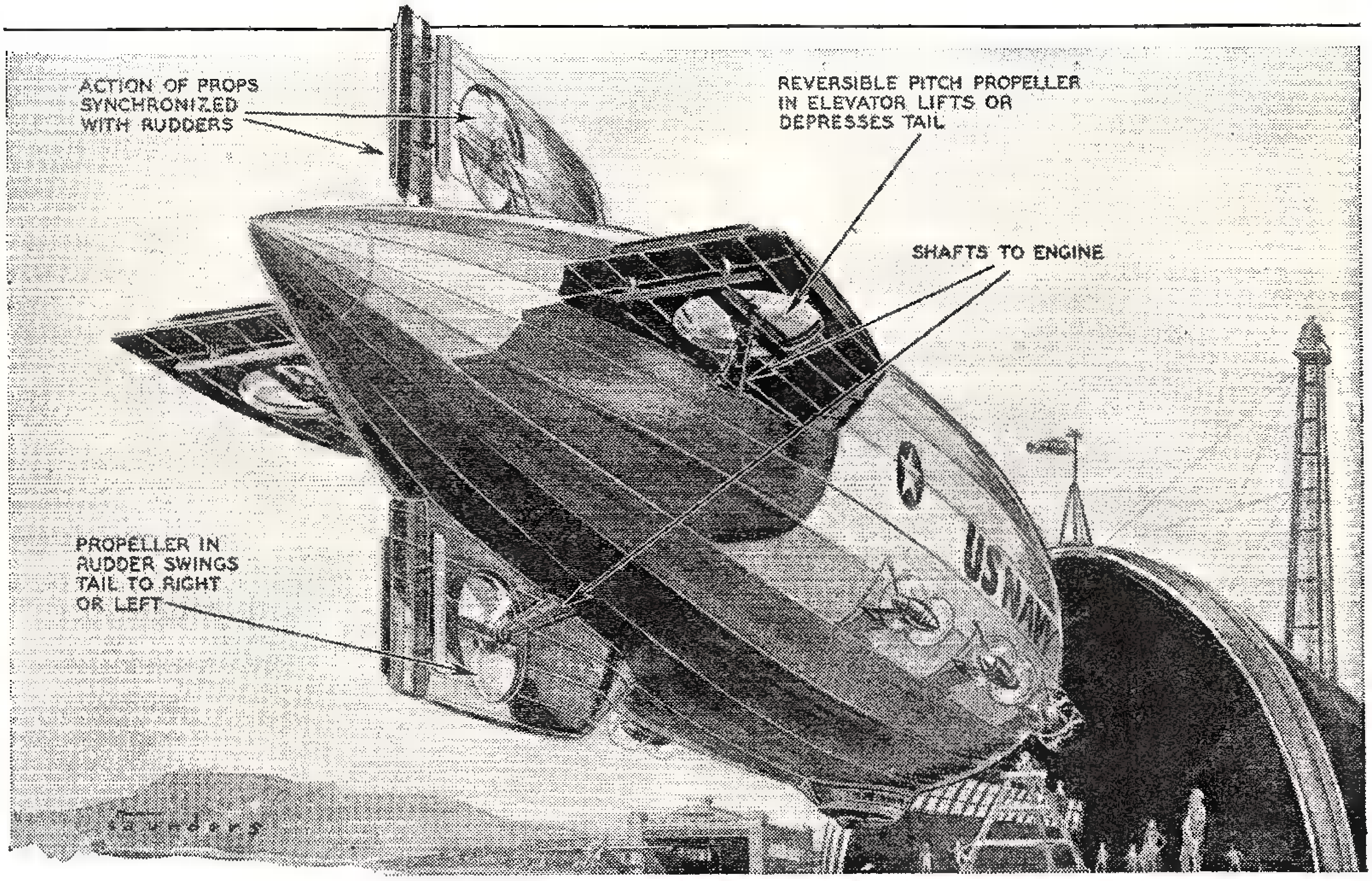
A MYSTERIOUS, formidable looking gun recently made its appearance in the heart of London. When night came, however, its secret was divulged. Curious spectators learned that it shot light instead of shells. Shown below, the "gun" uses as "powder" a 450 million candlepower lamp, capable of projecting a beam 15 miles into the sky. Its function is to write advertisements on the clouds which hang perpetually over London.

All equipment, including a heavy duty generator, is carried on a truck. Slides which form the letters in light are 12 inches in diameter.



450 million candlepower lamp on breach of this London gun shoots light advertisements 15 miles up into the sky.

PROPS in Rudders Aid ZEP Maneuvers


ACTION OF PROPS SYNCHRONIZED WITH RUDDERS
REVERSIBLE PITCH PROPELLER IN ELEVATOR LIFTS OR DEPRESSES TAIL
SHAFTS TO ENGINE
PROPELLER IN RUDDER SWINGS TAIL TO RIGHT OR LEFT
US NAVY

System of reversible pitch propellers installed within rudders and vertical fins of aircraft dispenses with ground crew and permits ship to be maneuvered when not in motion. When rudders are moved props are automatically set to proper pitch.

THE most ticklish task of piloting any dirigible, whether it be the smallest blimp or the mammoth Akron, is to maneuver the ship when it has slowed down for a landing. The conventional rudders and elevators require a constant flow of air over their surfaces to make them effective, and without the assistance of a large ground crew the gas bags are entirely out of control and at the mercy of every gust of wind when ship is not in motion.

Emery Koch, a German engineer, has recently obtained patents on a steering device which promises to make aircraft maneuverable at all speeds.

This device consists of four reversible pitch propellers installed within, or in place of, the rudders and vertical fins of the aircraft, as illustrated on the cover this month. These propellers will be connected with either the main motor of the ship or an auxiliary engine, and will be constantly in motion.

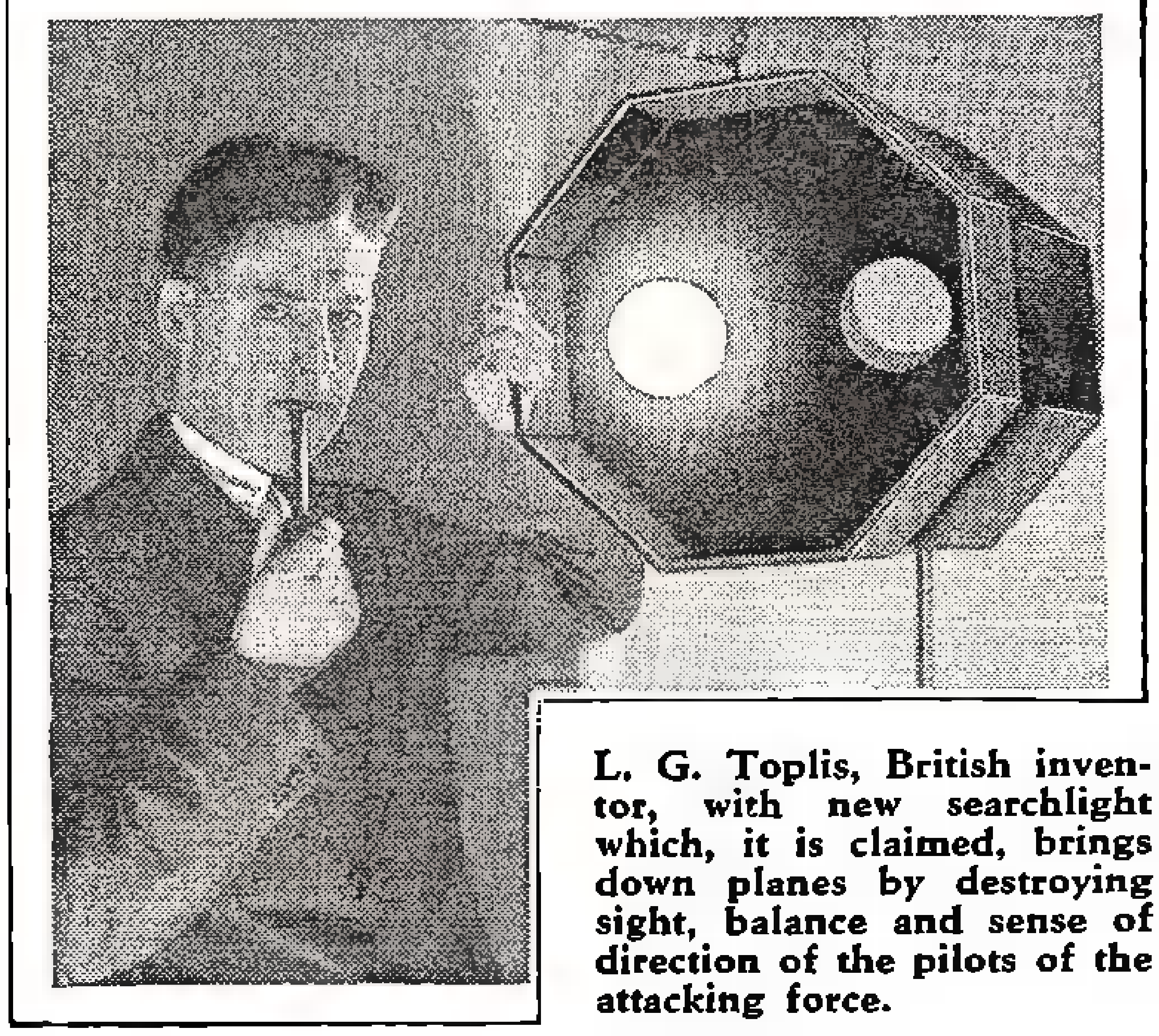
By means of a cleverly devised rack and pinion gear system connected with the steering wheel the propeller blades will be in a neutral position when the ship is moving forward. When the rudders are moved the steering propellers are automatically and instantly set to the proper pitch to assist in the turn.

Such a device will greatly increase the scope of the dirigible in exploration, since it will do away with the necessity of a ground crew for landing.

Searchlight Fights Enemy Planes

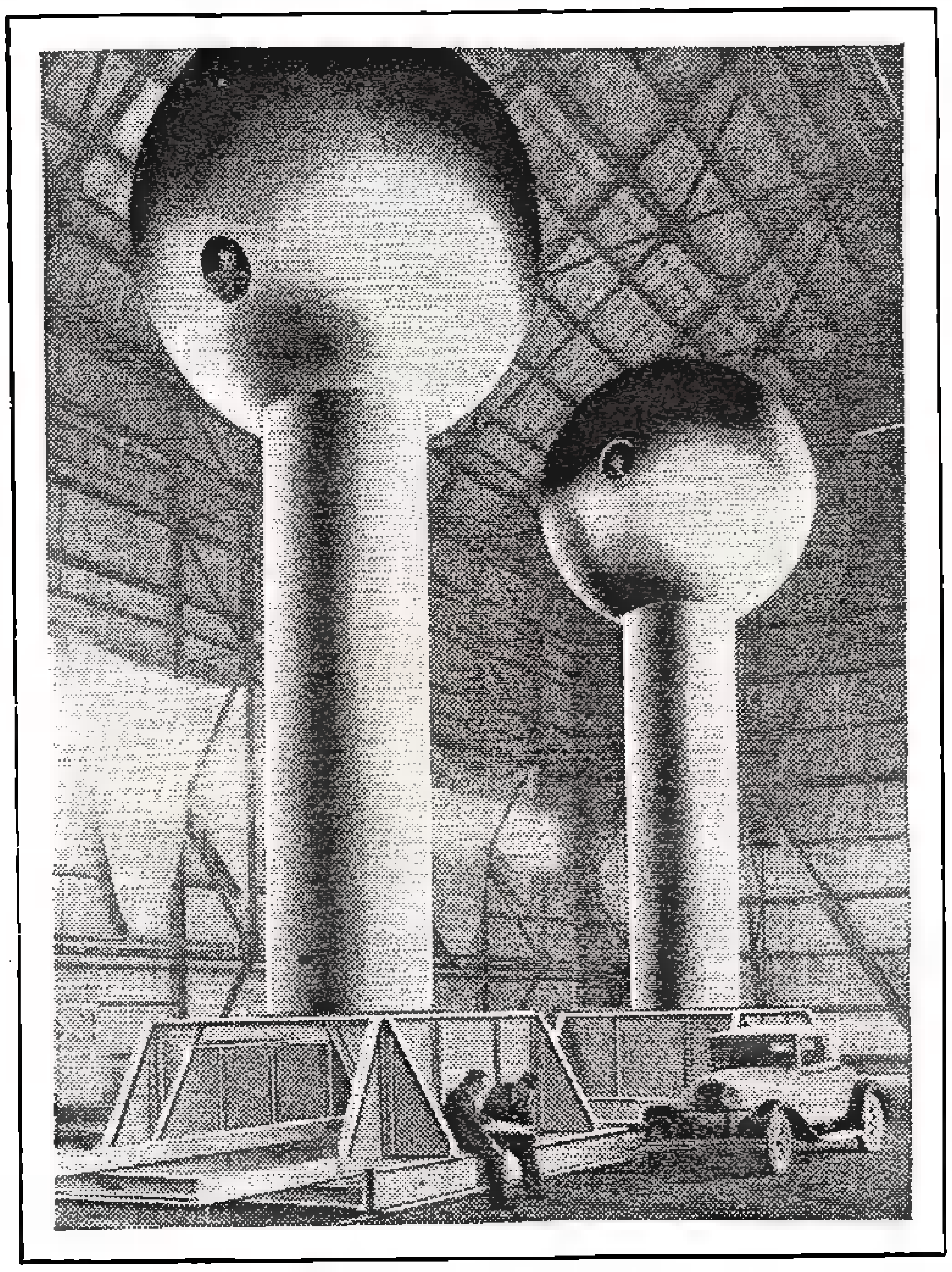
A NEW form of searchlight designed to render night attacks almost harmless and more dangerous to the attackers than the attacked, has been developed by a British inventor.

The light, shown below, projects a system of beams which, it is claimed, will confuse pilots, destroy their sight, balance and sense of direction, and eventually blind them and bring down their plane in confusion. The inventor, L. G. Toplis, is an electrical engineer of wartime experience.



L. G. Toplis, British inventor, with new searchlight which, it is claimed, brings down planes by destroying sight, balance and sense of direction of the pilots of the attacking force.

Giant Generator to Attack Atoms With 10,000,000 Volts



Almost ready for atom-splitting experiments, this giant Van De Graaf generator builds up a potential ten million volts by means of moving belt sprayed with electric charge. Laboratories are housed in giant spheres weighing half ton.

THE giant electrostatic generator designed by Dr. R. J. Van De Graaf, of the Massachusetts Institute of Technology, has now reached the state of development shown in the photo at the left.

This amazing new high potential generator is designed to deliver a voltage of ten million, and is expected to open up new fields of research including studies in the atomic energy of X-rays.

The spherical aluminum electrodes atop the columns are 15 feet in diameter and weigh a half ton each. The man in the sphere at the right is looking out of the port to which a discharge tube will be placed. The opening of the sphere at the left is a manhole for entrance to the compact laboratory contained in the huge balls.

The production of power by the generator is accomplished by means of endless silk belts operating inside the hollow columns from the base to a point within the spheres. These belts carry electrical charges sprayed on them at the base. This charge accumulates on the surface of the spheres, being negative on one and positive on the other. When each reaches a specific potential there is a flash between the terminals like a flash of lightning.

The generator is being housed in an airship dock at Round Hill, Massachusetts.

Sign Letters in Absorbent Cotton

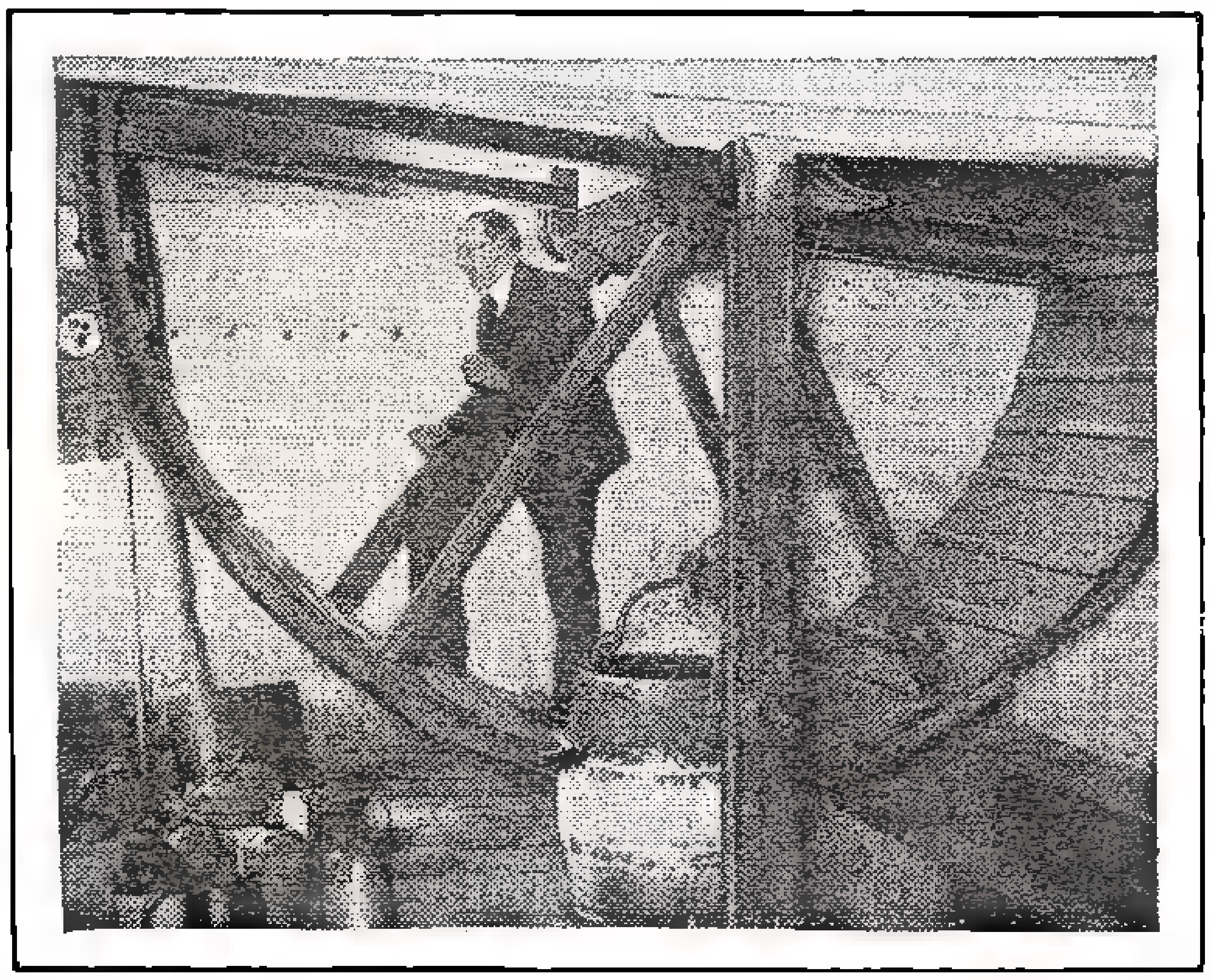
A CHICAGO druggist has found that window signs formed in absorbent cotton get striking results in the way of interested attention. In "painting" these signs the druggist first writes on the letters with a 1-inch brush just out of a library paste pot. The absorbent cotton is then applied—immediately. To enhance the attractiveness of the sign the druggist sprays the cotton with colored ink, employing an atomizer for the job.

The photo below shows how the sign appears on a soda fountain mirror. This little scheme does not need to be confined to extending Christmas greetings.

MERRY
CHRISTMAS

You can see from this photo how attractive is sign made from absorbent cotton colored with ink or other coloring.

Walk on Treadmill Draws Water

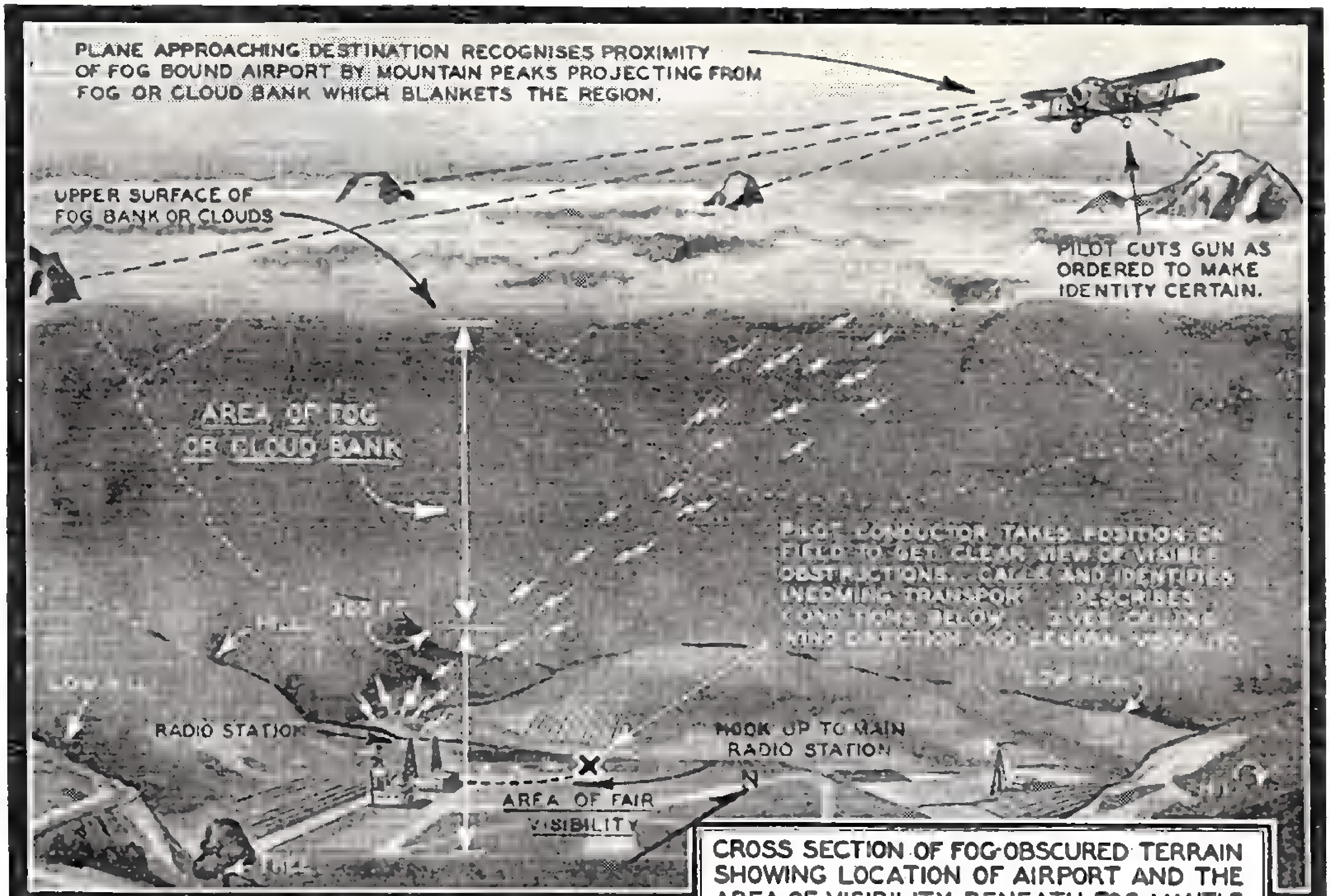


Revolving treadmill on shaft with pulley draws up water from 300 ft. deep well, thus utilizing health walk energy.

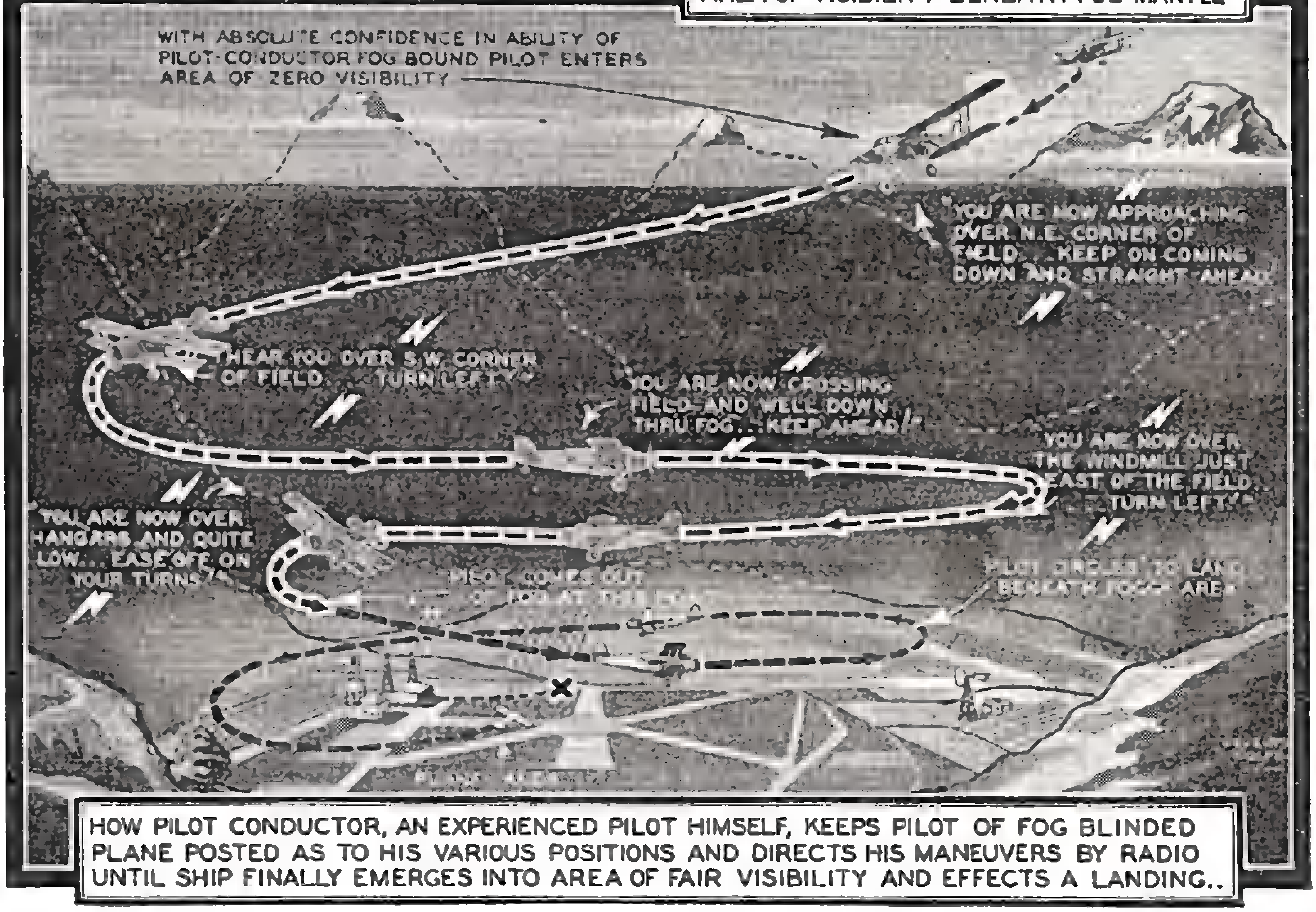
IT WAS left for an ingenious Englishman to think up a method of combining a rotary sidewalk and a wheel to draw water from a well. Each morning the inventor, Mr. Fred Horne, of Benworth, England, goes for a quarter of a mile walk in his treadmill and when he has finished it he finds he has drawn up a day's supply of water from a well 300 feet deep. The mill is 12 feet in diameter and proves an excellent exerciser.

The structure is made from 2x4's and 1" boards chiefly and has a 2-inch iron shaft to which is attached the pulley.

"Fog Conductor" Lands Planes from Ground


PLANE APPROACHING DESTINATION RECOGNISES PROXIMITY OF FOG BOUND AIRPORT BY MOUNTAIN PEAKS PROJECTING FROM FOG OR CLOUD BANK WHICH BLANKETS THE REGION.
UPPER SURFACE OF FOG BANK OR CLOUDS
PILOT CUTS GUN AS ORDERED TO MAKE IDENTITY CERTAIN.
AREA OF FOG OR CLOUD BANK
PILOT CONDUCTOR TAKES POSITION ON FIELD TO GET CLEAR VIEW OF VISIBLE OBSTRUCTIONS... CALLS AND IDENTIFIES INCOMING TRANSPORT ... DESCRIBES CONDITIONS BELOW ... GIVES CEILING WIND DIRECTION AND
HILL
LOW HILL
RADIO STATION
HOOK UP TO MAIN RADIO STATION
AREA OF FAIR VISIBILITY

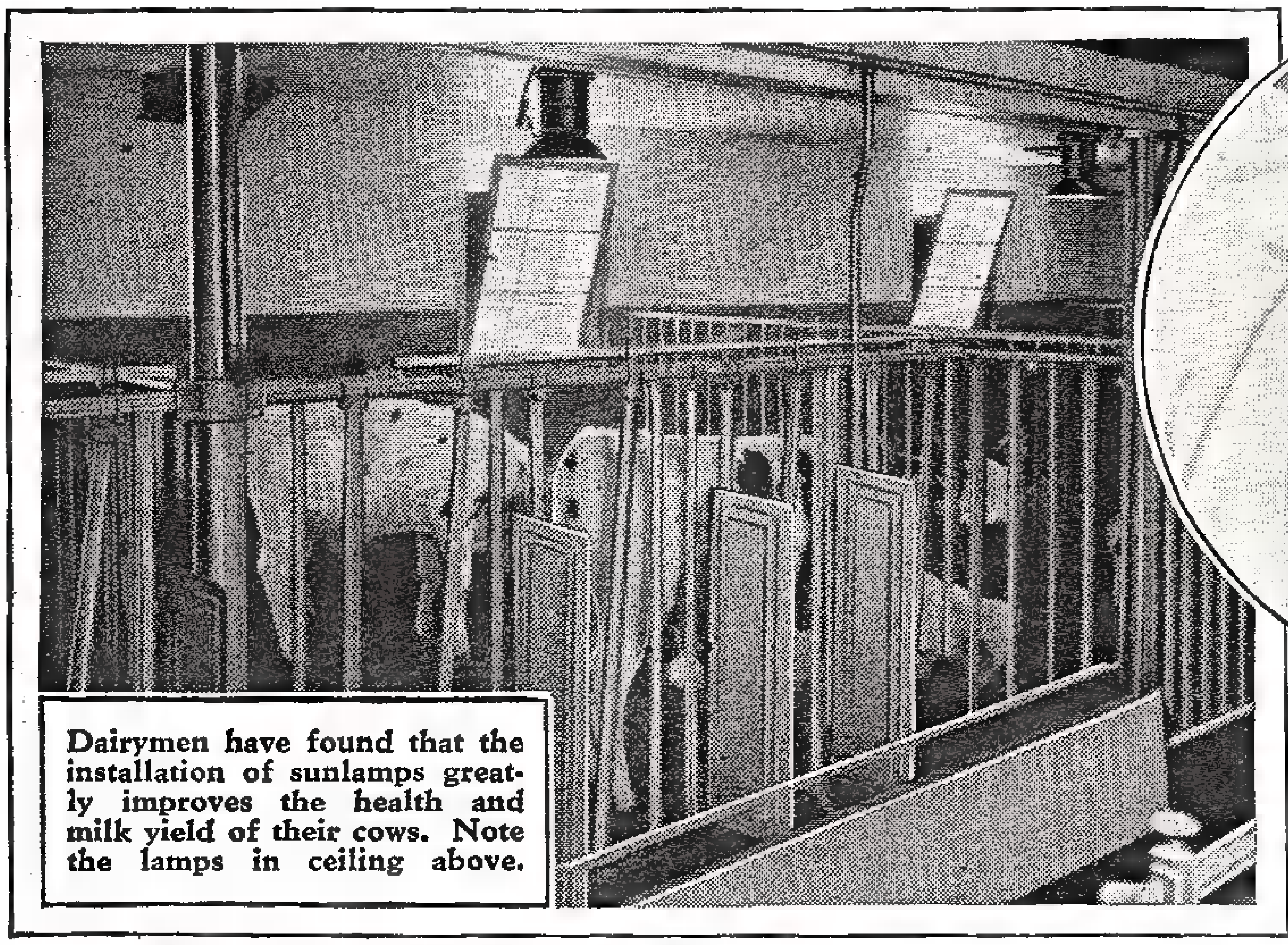
CROSS SECTION OF FOG-OBSCURED TERRAIN SHOWING LOCATION OF AIRPORT AND THE AREA OF VISIBILITY BENEATH FOG MANTLE


WITH ABSOLUTE CONFIDENCE IN ABILITY OF PILOT-CONDUCTOR FOG BOUND PILOT ENTERS AREA OF ZERO VISIBILITY
"YOU ARE NOW APPROACHING OVER N.E. CORNER OF FIELD.. KEEP ON COMING DOWN AND STRAIGHT AHEAD"
"HEAR YOU OVER S.W. CORNER OF FIELD. TURN LEFT!"
"YOU ARE NOW CROSSING FIELD AND WELL DOWN THRU FOG... KEEP AHEAD!"
"YOU ARE NOW OVER THE WINDMILL JUST EAST OF THE FIELD.. TURN LEFT!"
"YOU ARE NOW OVER HANGARS AND QUITE LOW... EASE OFF ON YOUR TURNS!"
PILOT COMES OUT OF FOG AT THIS POINT
PILOT CIRCLES TO LAND BENEATH FOGGY AREA

HOW PILOT CONDUCTOR, AN EXPERIENCED PILOT HIMSELF, KEEPS PILOT OF FOG BLINDED PLANE POSTED AS TO HIS VARIOUS POSITIONS AND DIRECTS HIS MANEUVERS BY RADIO UNTIL SHIP FINALLY EMERGES INTO AREA OF FAIR VISIBILITY AND EFFECTS A LANDING..

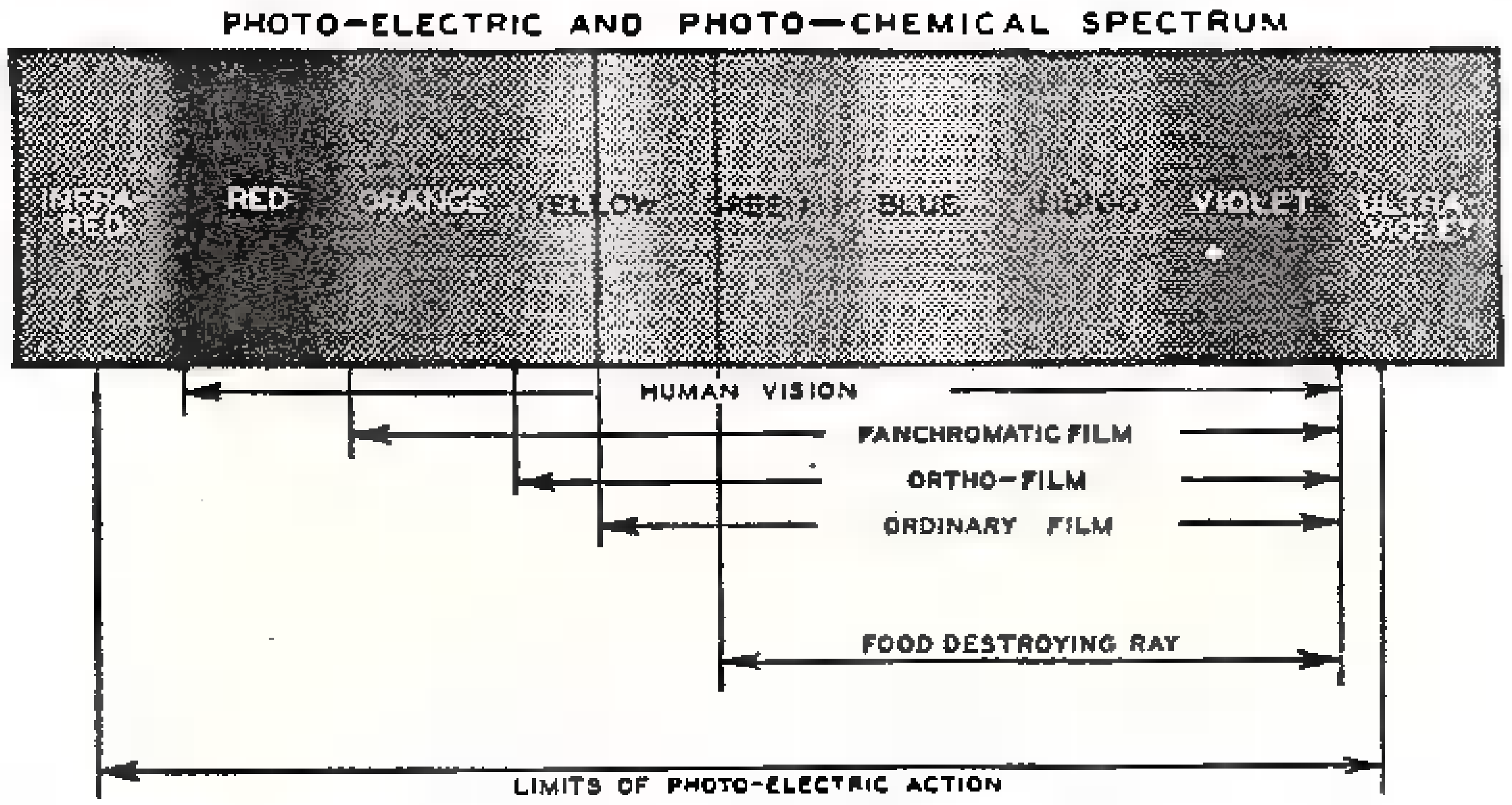
Fog-bound airplanes which arrive in the vicinity of a landing field but which are unable to come down because the ground is invisible, find it comparatively simple to effect a safe landing with the aid of a "pilot conductor," a late development. This conductor is a man familiar with the field, who gauges the position of the plane from the sound of its motor and directs it to a safe landing through a radio conversation, in the manner graphically depicted in above drawing.

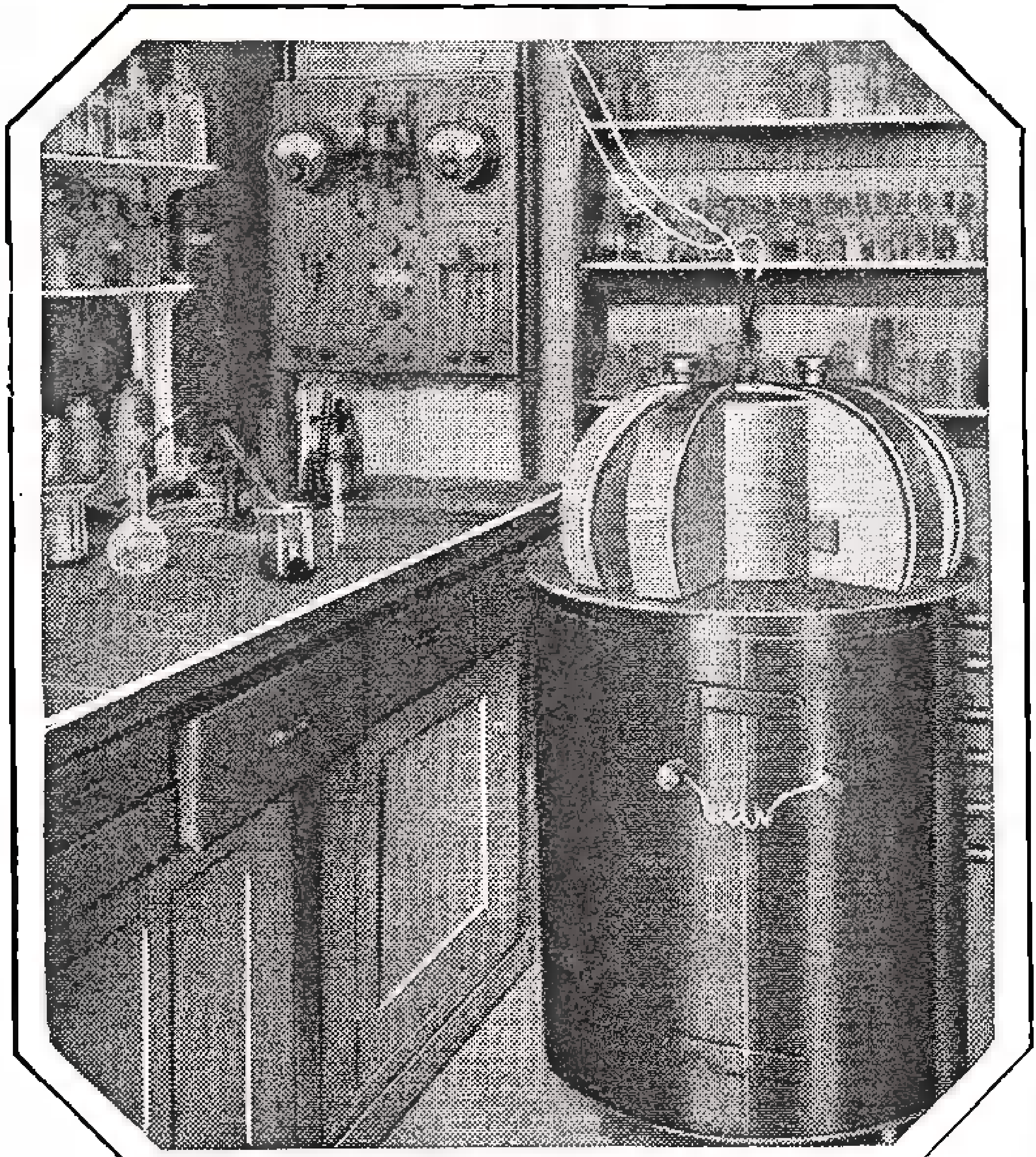
LIGHT—Mystery Worker of



Dairymen have found that the installation of sunlamps greatly improves the health and milk yield of their cows. Note the lamps in ceiling above.

Scientists have found that light has a powerful chemical action on certain foods. Here a leaf of lettuce is being treated through a filter to determine effect of light.





Here is an X-ray diffraction apparatus that will record the crystal patterns of fifteen various substances and thus permit chemists to accurately determine their compositions. At top is spectrum chart showing effects of light on film.

IN 1887 a purring cat kicked over a dish containing an extract of nut-galls and chemists began to ponder on the weird and mysterious chemical action of light. That was back when Talbot was experimenting with some half-exposed papers covered with silver chloride. This making visible of the chemical effects of light was of far-reaching importance. It gave us photography, made us light conscious from a scientific viewpoint.

Our coal deposits, the formation of sugar in plants through the catalytic action of light in connection with chlorophyll, the fading of fabrics and paint, sunburn and photography are all commonly known to be the result of photo-chemical action.

Not so commonly known, however, is the fact that sunlight kills our auto tires, spoils certain food, breaks down certain oils and decomposes many of the chemicals and drugs that we buy at the drug store. Indeed our chemists are just waking up to the fact that countless millions of dollars worth of materials are destroyed this way annually.

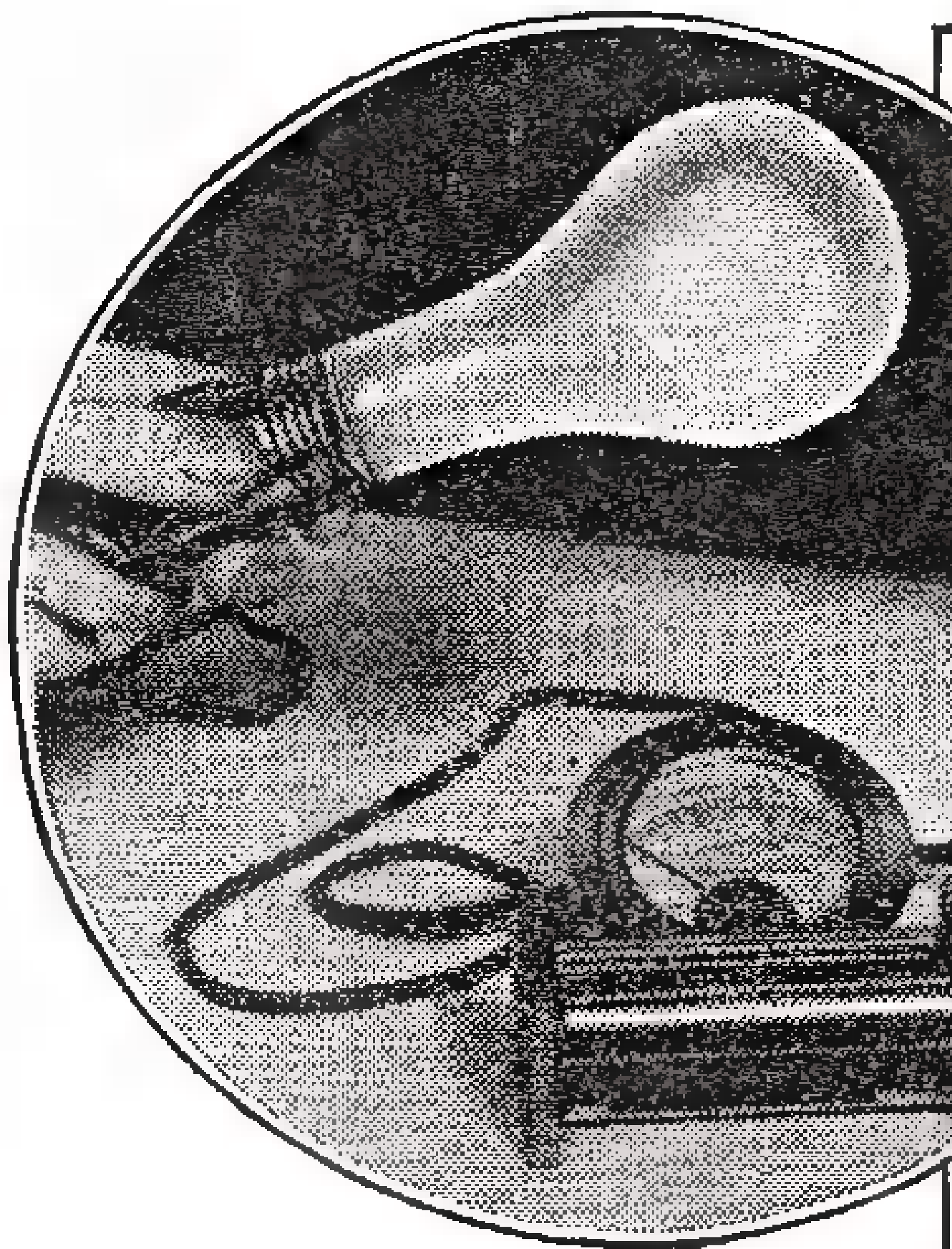
The problem of thwarting this harmful effect of light is aggravated by the fact that certain wavelengths and not white light as a whole bring about the changes. That is to say that all of the colors of light are not equally effective in a single case.

In the action of light on silver chloride (photography) it has been the green and blue lights that have been most effective, while the reds and yellows have been, until very recently, the bad boys who refused to be finger-printed. On the other hand, where the action of light and chlorophyll is concerned in the generation of sugar for plants, it is red and yellow light that causes changes.

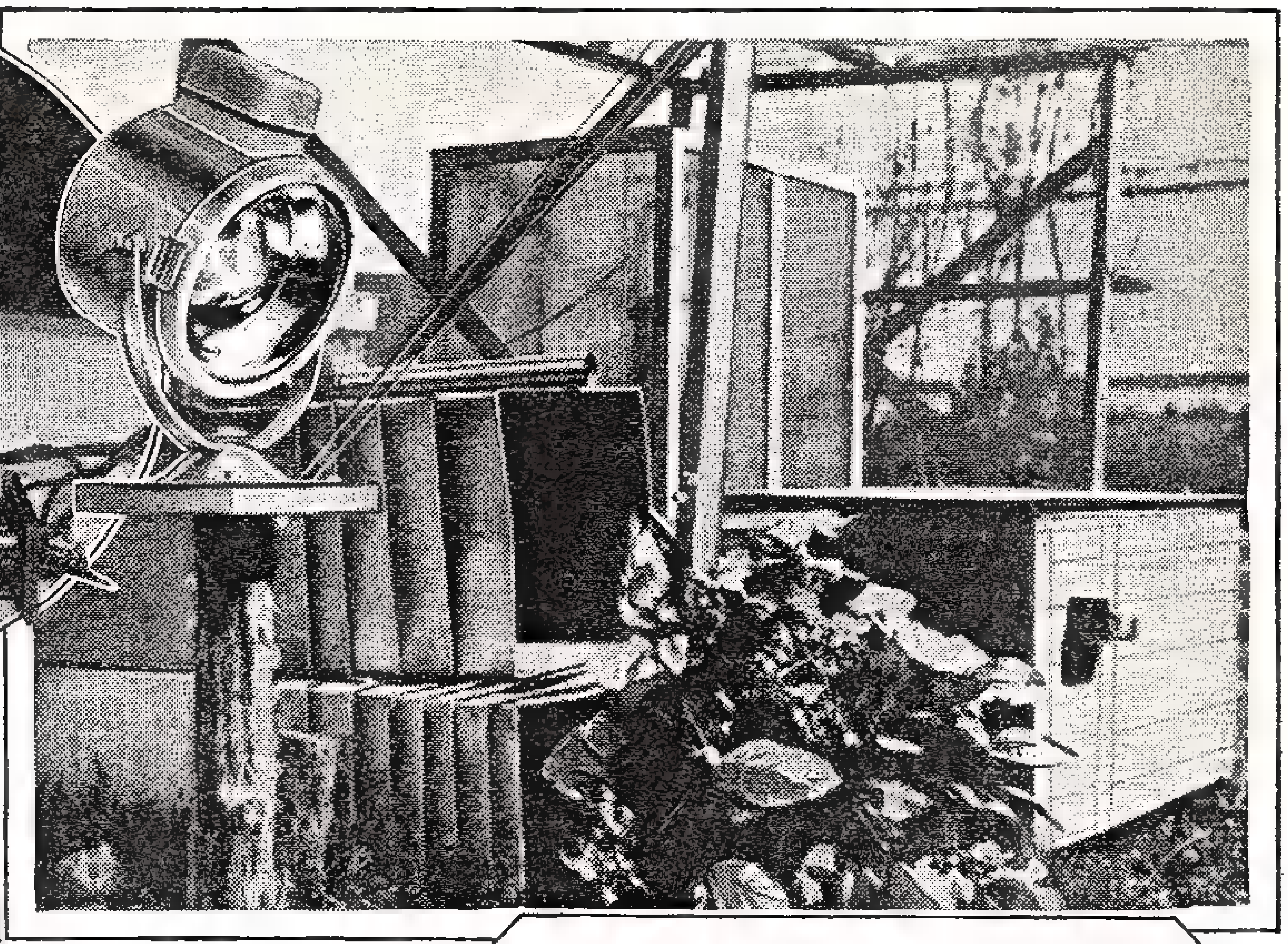
We may prove this by trying to raise a plant with a color filter that will not permit

Modern Science

It affects what you see, what you eat, what you wear!



Light falling upon photo-sensitive surfaces generates electricity, showing close relation that light may bear to chemistry.



Many enterprising farmers in the country are using searchlights to supply artificial sunlight to hasten the growth of plants, as may be seen above. Plants that bloom only in spring or summer can be forced to bloom in the dead of winter. Left — Chemical manufacturers are now putting out many of their products in brown glass bottles to protect contents from light.

Ceiling-type sunlamps installed at swimming pool in the Hotel St. George, Brooklyn, to improve health of bathers.

red and yellow to pass. The plant soon dies. Under these conditions, it will assimilate none of the carbon dioxide present in the air.

Nowadays when we go to the drug store we notice that an increasingly large number of drug manufacturers are placing their products in colored glass bottles to preserve them. Brown of a certain very definite shade is being used a great deal, especially in preparations where it is desired to keep the gas chlorine associated in some sort of a weak union.

Chlorine is a sort of chemical turn-coat in its action with light. When it is mixed cold with hydrogen and placed away in a *dark* cold place, its combining power is too slow to be perceived. Light a ribbon of magnesium beside this innocent jar, however, and you will treat yourself to an explosion caused by nothing more tangible than the light you generated.

We have been considering the destructive ways of light. We must not remain unmindful of its many benefits; indeed its utter necessity. Light has been found to add something vital to foods. It was found some time ago that a certain brand of high-powered cathode rays, a sort of violent form of light, had the power to impart to breakfast foods some element that prevents rickets in the children who eat the foods.

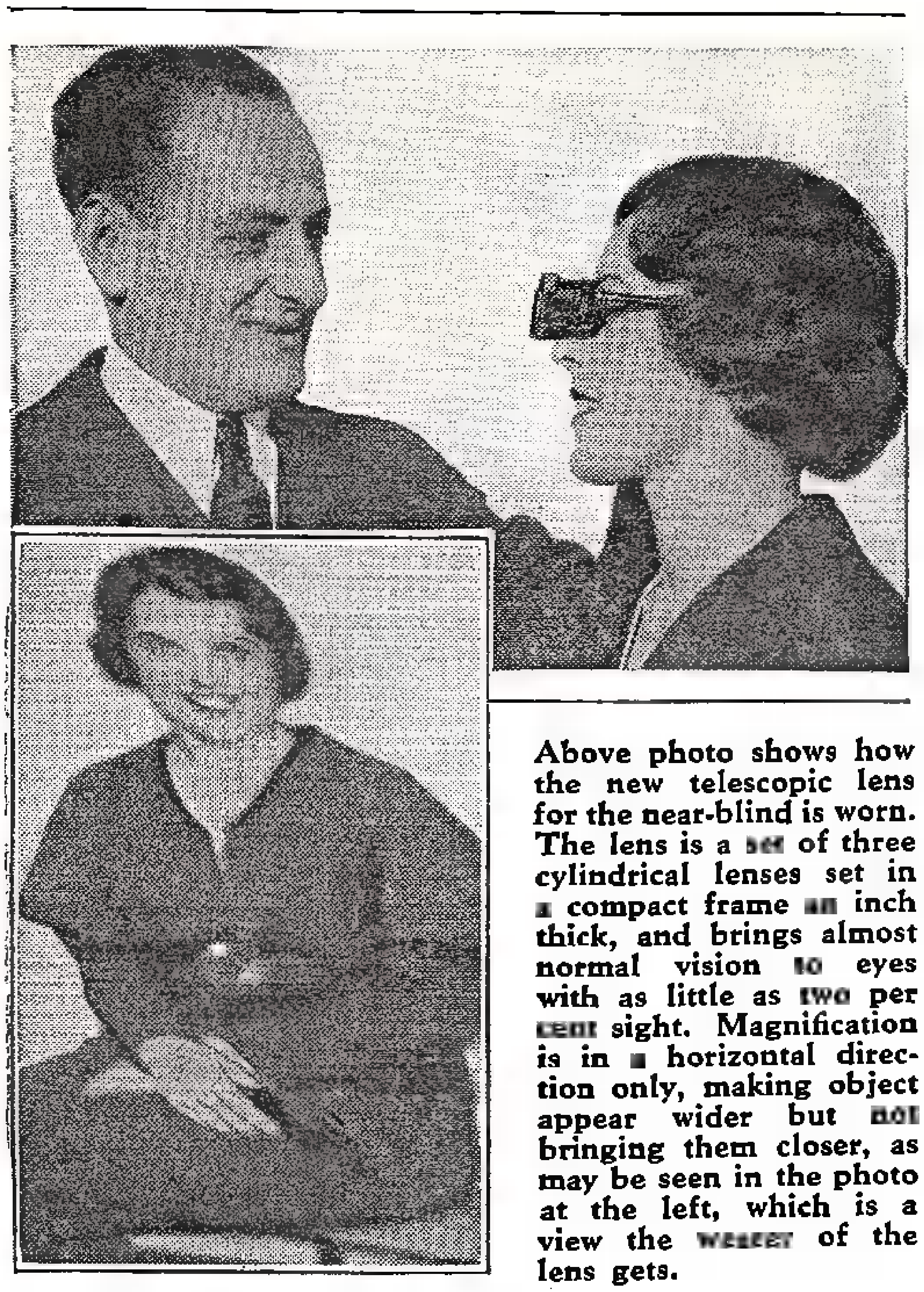
Today we have a number of foods prepared in the glare of certain kind of light. Even cigarettes have been treated with light in a process that is supposed to reduce irritating ingredients. Then we have many irradiated preparations that may be bought at the corner drug store.

New Telescopic Lens Will Restore Sight to the Near-blind

A NEW type of telescopic lens that will bring vision to eyes with as little as 2 per cent sight was demonstrated recently at the annual convention of the American Academy of Optometry.

Where the old type of telescopic lens enlarges the object in all dimensions, making them appear closer than they are and possibly causing accidents to the wearer, the new lens magnifies horizontally only, making objects appear wider but not bringing them closer, thus permitting accurate sight for distance.

The new lens is a set of three cylindrical lens set in a compact frame an inch thick. How objects appear to the wearer is seen at the left.



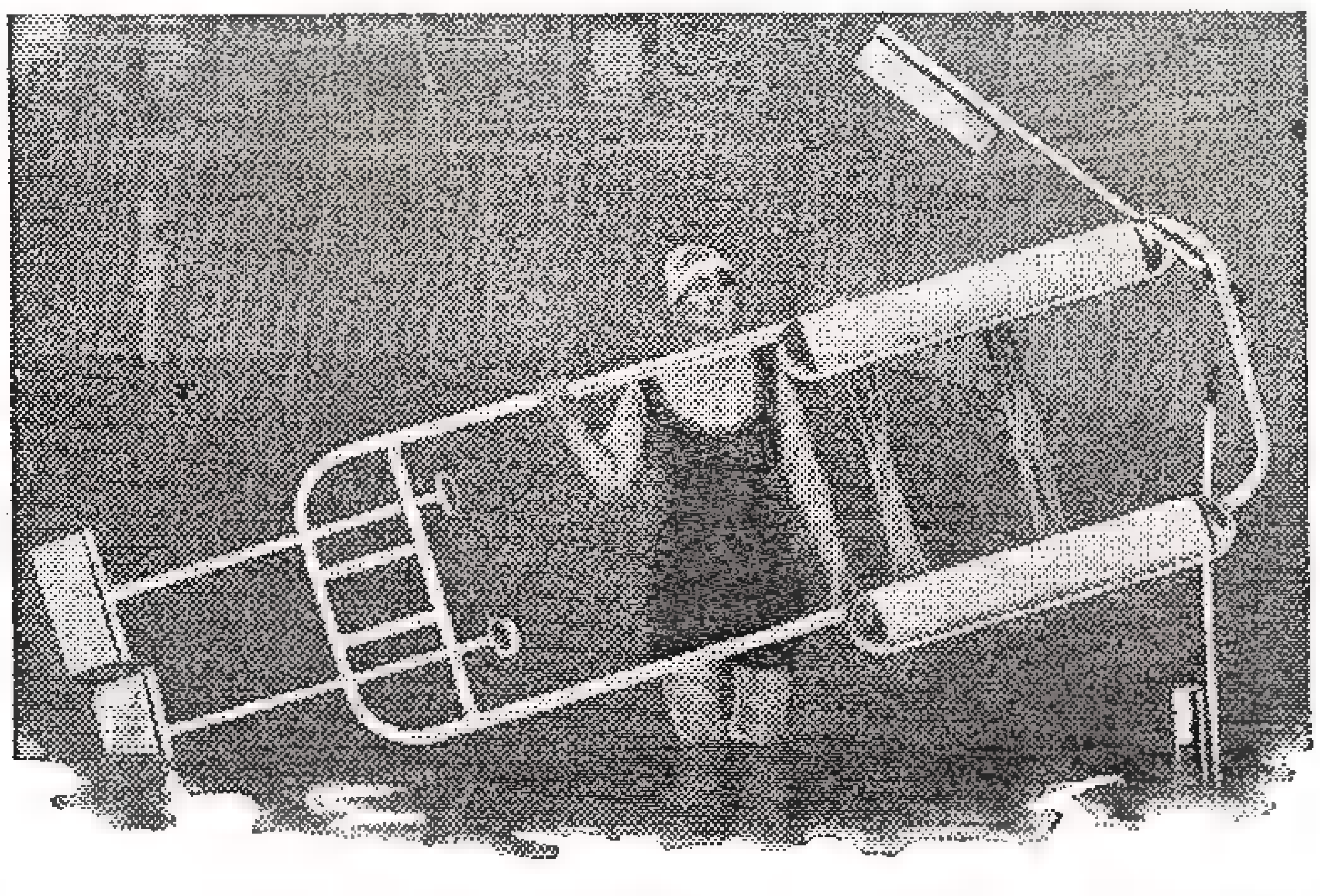
Above photo shows how the new telescopic lens for the near-blind is worn. The lens is a set of three cylindrical lenses set in a compact frame an inch thick, and brings almost normal vision to eyes with as little as two per cent sight. Magnification is in a horizontal direction only, making object appear wider but not bringing them closer, as may be seen in the photo at the left, which is a view the wearer of the lens gets.

Floating Frame Teaches Swimming

A NOVEL floating apparatus designed to enable persons ordinarily afraid of water to learn how to swim with a minimum of danger has been introduced in Germany.

The device, shown in the photo below, is equipped with two pontoons and four keels which regulate its height in the water. The legs of the swimmer are fastened in ropes which operate the rear paddles. These are so arranged that they open when pushed and close when pulled.

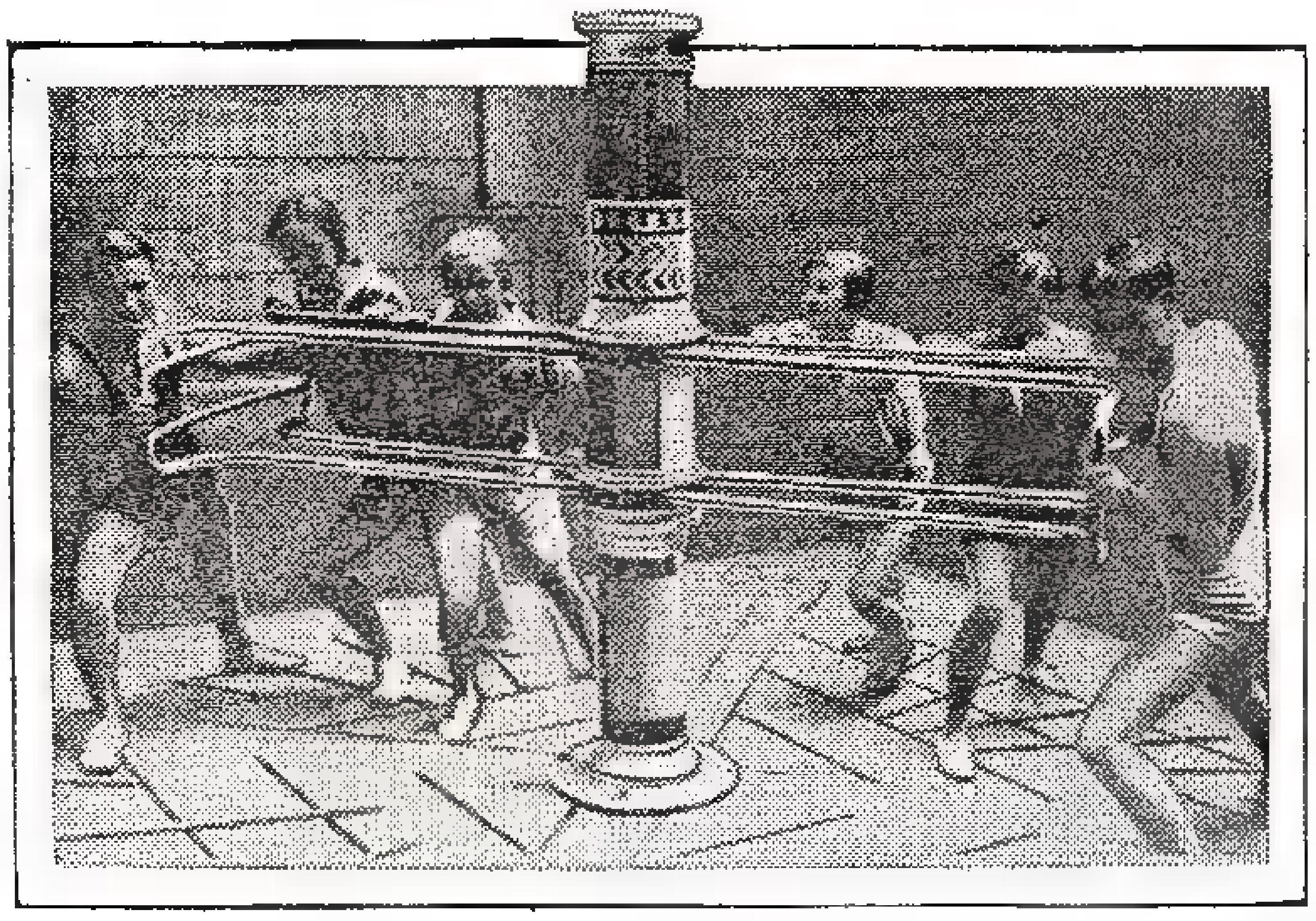
In operation the swimming student lies across straps in the frame, and works the paddles much in the manner of a rowboat. One of the features of the device is that it can be easily carried about.



Resting body on straps, the swimmer navigates by working the oars with the hands and pushing pedals with feet.

Turnstile Becomes Tug-o'-war

A SPORT which strengthens the body and at the same time provides a fascinating and competitive game has been introduced in France. The device is made up of a central post supporting a system of horizontal bars. The players are divided into two parties or sides, so that they may play a sort of tug-o'-war or pushing game. The central post is so marked that the players can tell at a glance how much progress they have made or lost as the result of their efforts.



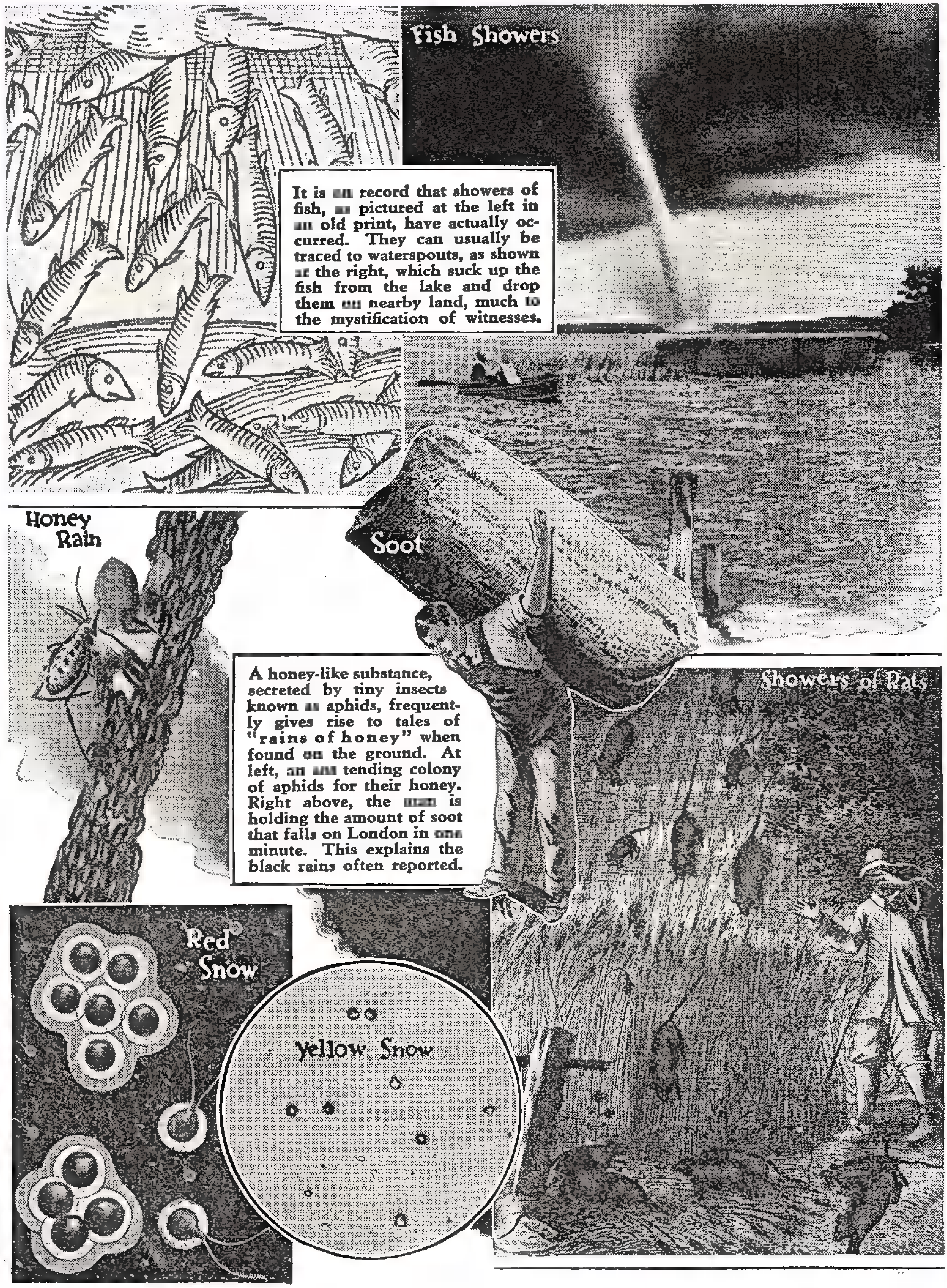
In this new turnstile game, the contestants push against a set of horizontal bars revolving about the central post.

Planet Mercury Is Airless World

CONFIRMATION of the theory that the planet Mercury, closest of all planets to the sun, is a dry, sun-baked world lacking both water and air, has been obtained by a series of spectrographic observations at Mount Wilson Observatory.

Spectroscopic tests of the sunlight reflected back to the earth from Mars have disclosed that Mars possesses a thin atmosphere containing oxygen, water vapor and other gases. The air of Venus has been examined similarly and is believed to contain carbon dioxide gas. Still other gases, resembling ammonia and the hydrocarbons, are suspected in the atmospheres of some of the outer planets, such as Jupiter and Saturn. The recent tests on Mercury, however, came out a complete blank.

Black Rain, Yellow Snow, Fish Showers
—HOW DO THEY GET THAT WAY?

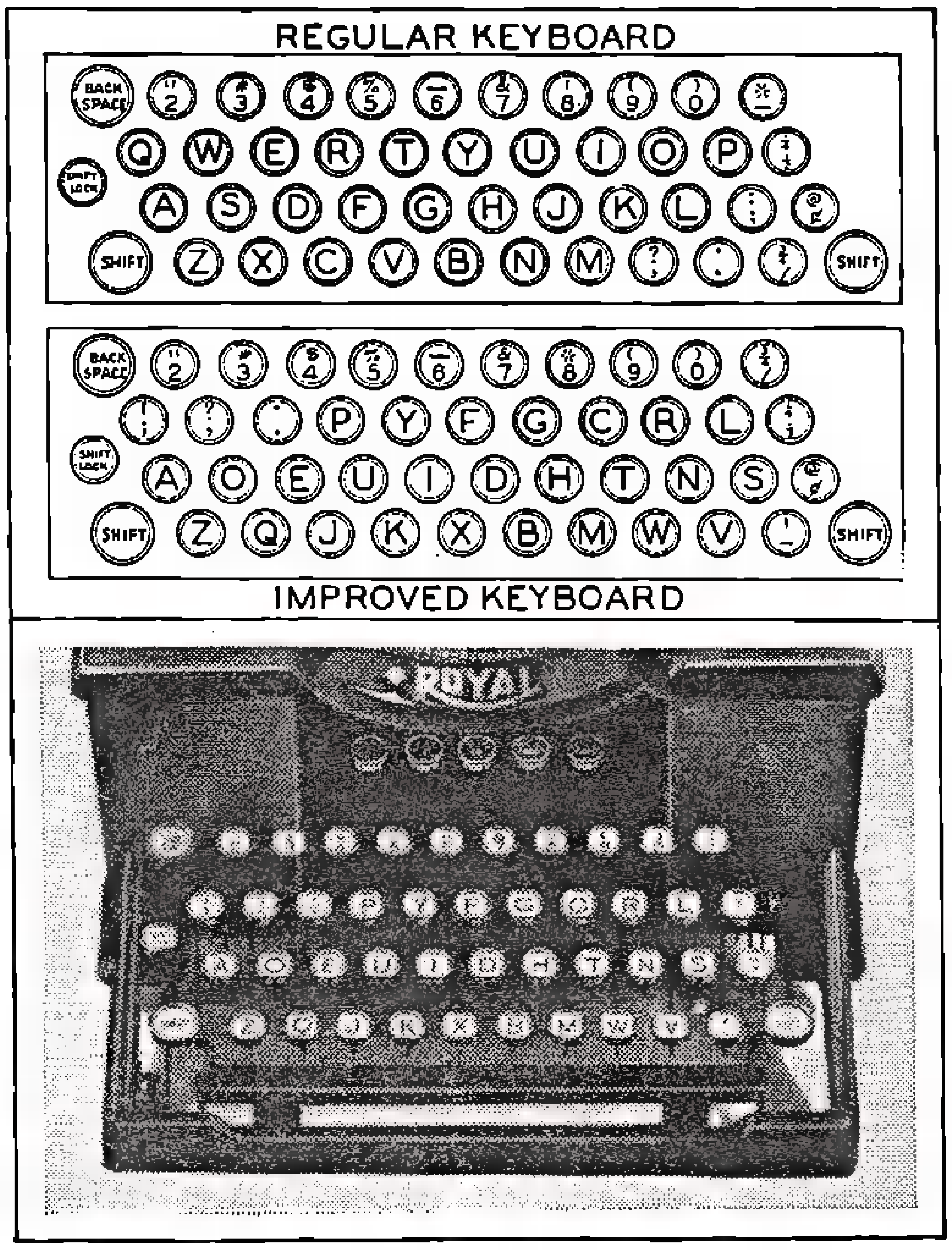


It is on record that showers of fish, as pictured at the left in an old print, have actually occurred. They can usually be traced to waterspouts, as shown at the right, which suck up the fish from the lake and drop them on nearby land, much to the mystification of witnesses.

A honey-like substance, secreted by tiny insects known as aphids, frequently gives rise to tales of "rains of honey" when found on the ground. At left, an ant tending colony of aphids for their honey. Right above, the man is holding the amount of soot that falls on London in one minute. This explains the black rains often reported.

Red snow is colored by micro-organisms of varying species, such as Sphaerella nivalis, shown above. Sulphur showers are really caused by pollen brought down with precipitation—in circle, pollen grains are shown, adhering to oiled plate attached to an airplane. Showers of rats, illustrated in the old print above, are attributed to migration of lemmings, rat-like animals which die on land in great numbers, giving rise to legends that they have fallen in showers. The lemming migration is a natural phenomenon observed in various Scandinavian countries.

Typewriter Keyboard Boosts Speed, Cuts Fatigue, Errors



Alteration in arrangement of the keyboard reduces ten and one-half million awkward letter combinations to a million and one-half. Words most commonly used are in the main row where they are most easily accessible to the typist.

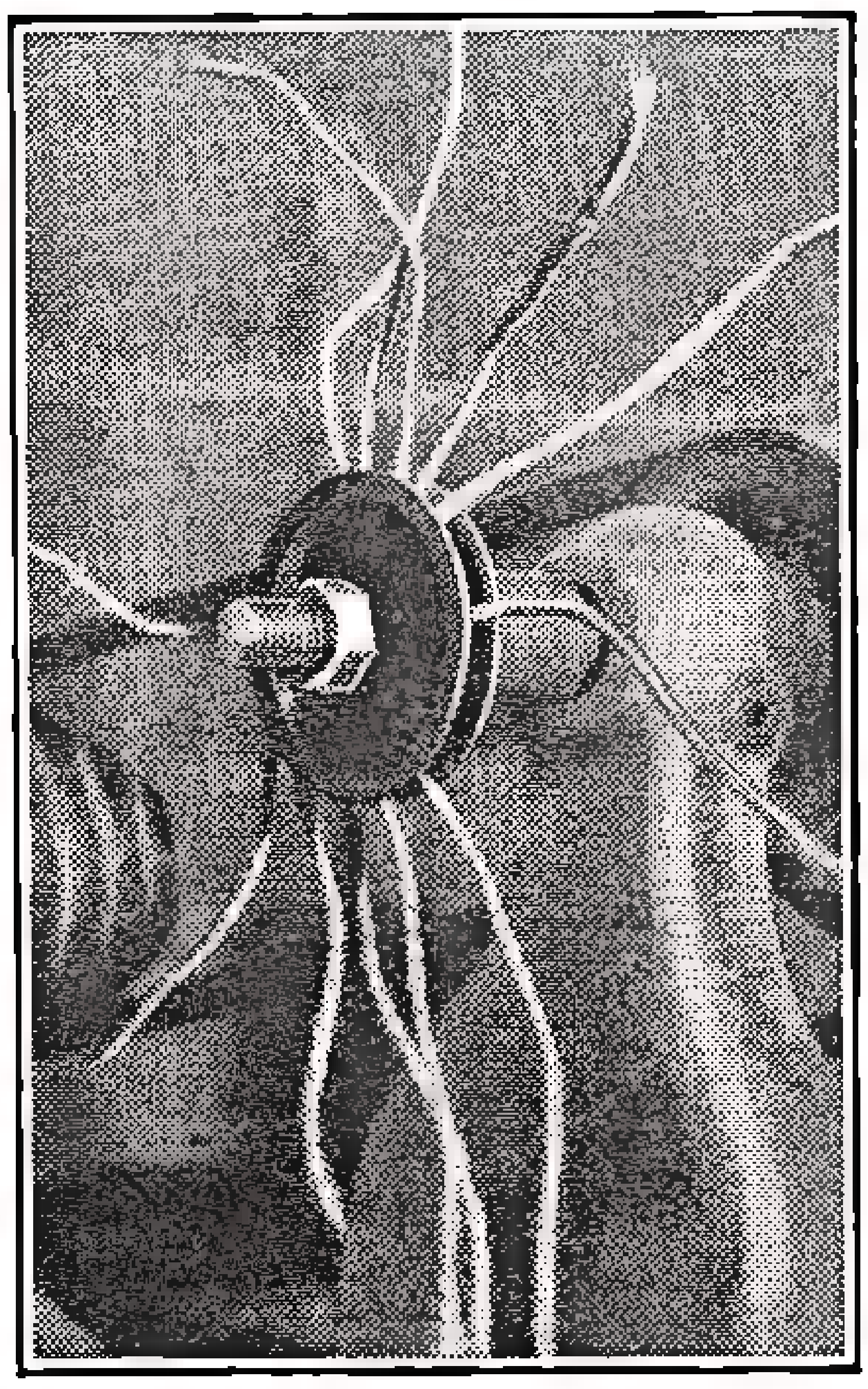
A PROMINENT college efficiency expert at the University of Washington, Dr. August Dvorak, has calculated that there are about ten and a half million awkward letter combinations to contend with in the alignment of keys on the standard typewriter. So he has devised a new system which reduces this number to a million and a half.

The arrangement is shown at the left. By concentrating the letters most frequently used on the second row above the spacer, or main line, with the less frequent punctuation points on the third line, and with the remaining consonants in the third row, both hands are brought into action with a more equal distribution of labor.

This contrivance produces a natural rhythm which increases speed, reduces fatigue and lessens chances of error, it is claimed.

Polishing Whip for Lacquer Work

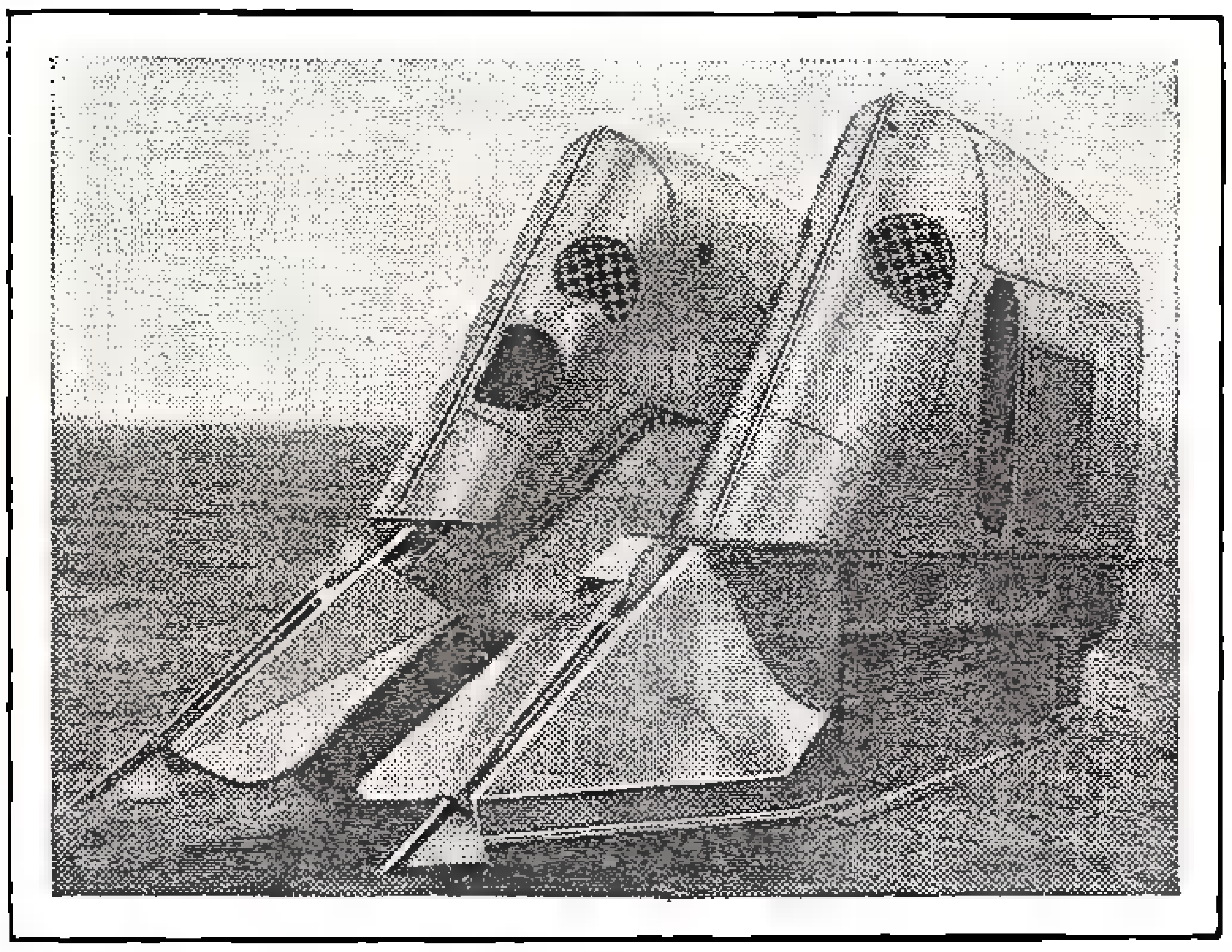
THIS simple polishing whip is ideal for polishing small spots on finished surfaces which have been repainted or lacquered. When this is to be done the spot should be fixed and the final finish put on and allowed to dry. Then the base is simply held in the hand and the whip, turned at about 3500 r.p.m. is played over the spot. A finish equal to the rest of the surface is the result. To make the whip, the emery wheel was removed from between the metal collars and three or more lengths of thick, stiff cord tied on the shaft. Then the other collar is put back in place and the nut turned up tightly. Whip lengths are trimmed even, and the motor turned on. The high speed whipping action brings out a fine gloss. This stunt is used where novelties are manufactured.



Cords are held between collars of emery wheel as demonstrated.

Tank Plow Replaces Sugar Workers

A STRANGE looking contraption may be seen meandering around the sugar plantations of Java these days. Shown in the photo below, the thing is a sort of a tank that plows up the soil between the young sugar cane shoots. It's really a whole army of plantation workers built into a steel casing, on a caterpillar track. In the photo note the gouges and the flanges for spreading the soil.



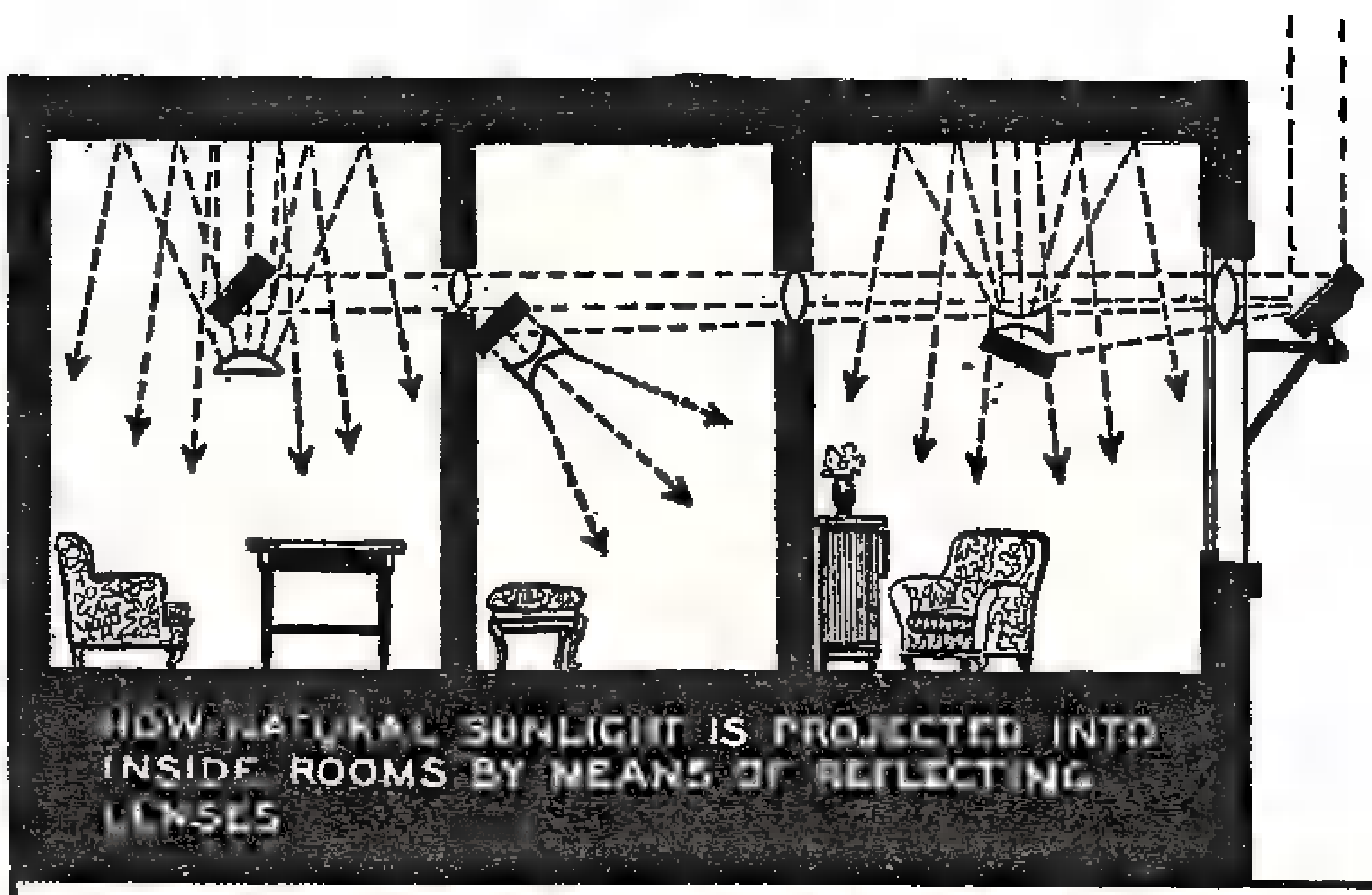
Combination plow and tank mounted on a caterpillar tractor is used in cultivating Java sugar fields. It does the work of a whole army of plantation workers in the field.

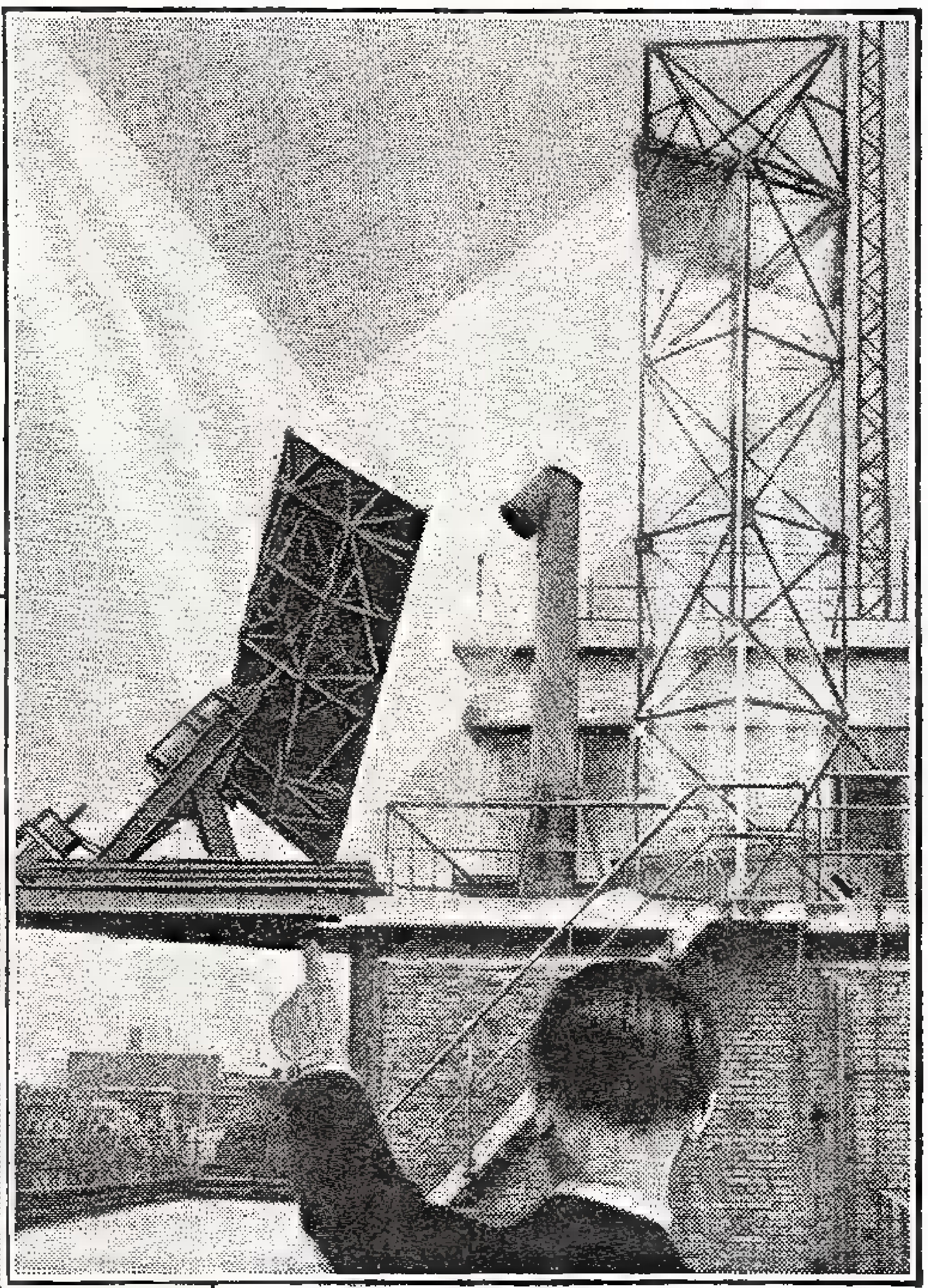
2 Hours for Lunch in New Era

TWO hours for lunch for all workers in factories or offices, with a requirement that all or nearly all of this time be spent out-of-doors and in the sunshine, has been suggested as a desirable result of present economic changes.

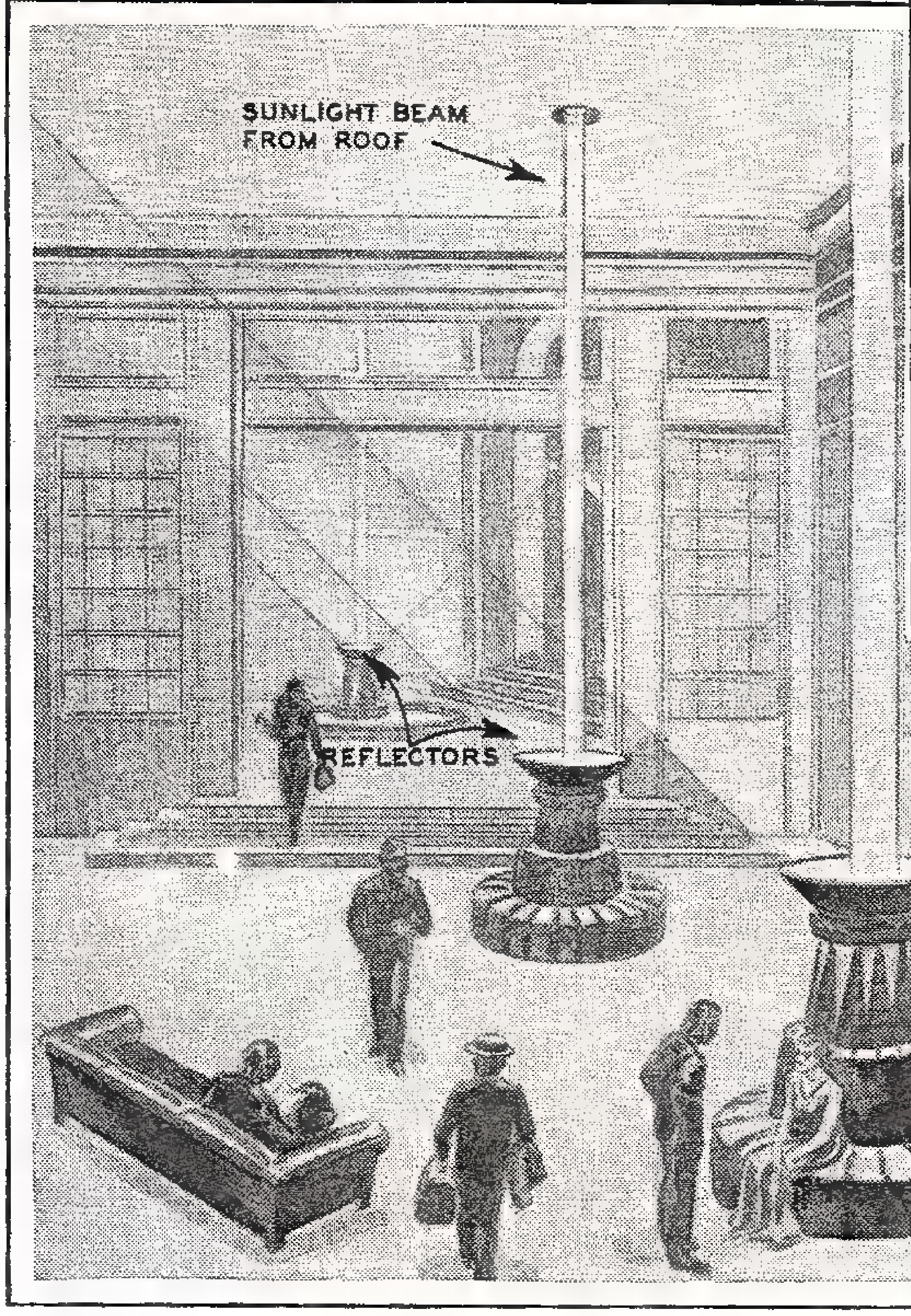
At midday the ultra violet rays are likely to be plentiful and the health value of a given number of minutes in the sunlight is correspondingly greater. Noon vacations will increase production.

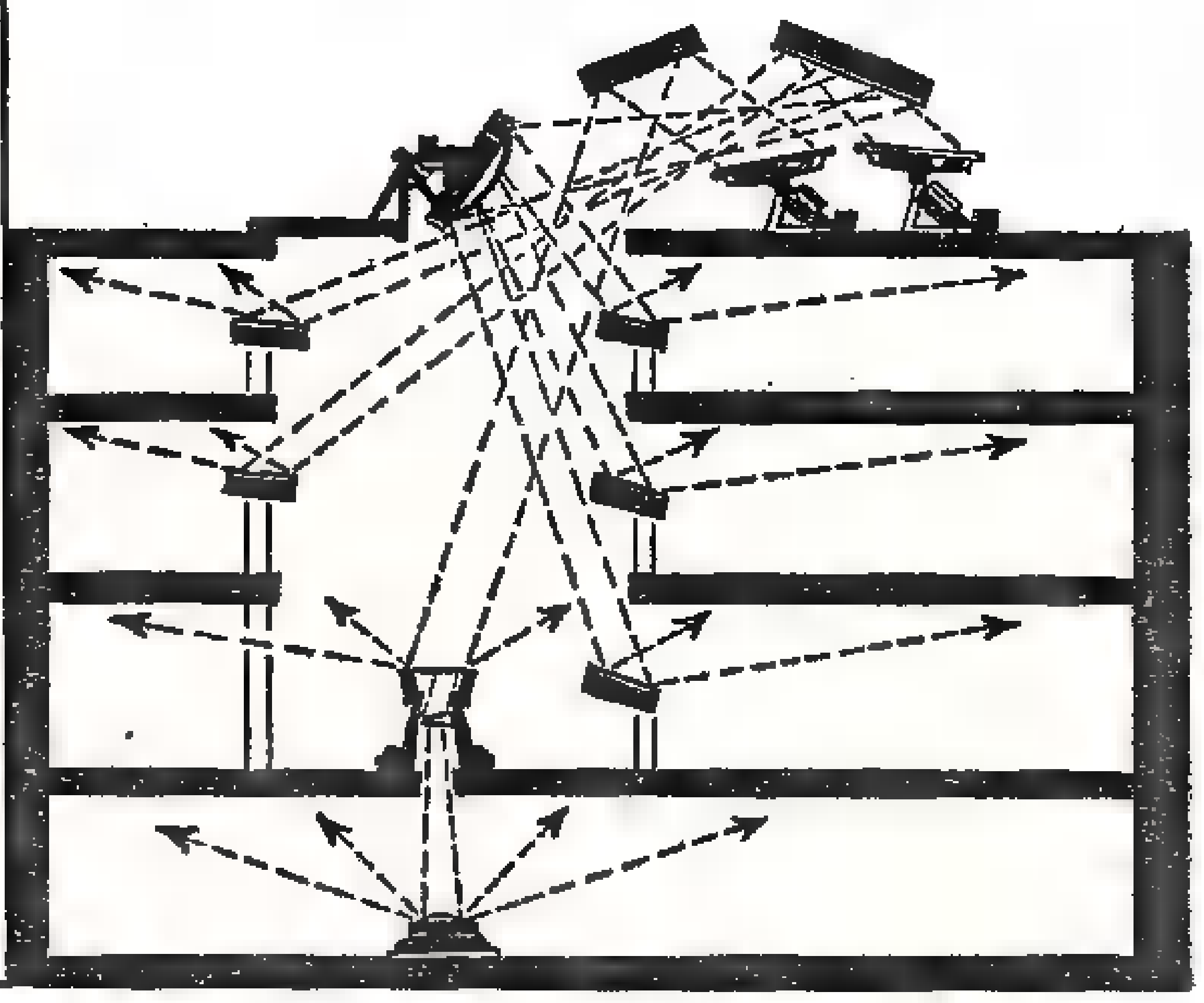
Buildings LIGHTED by Natural Sunlight


HOW NATURAL SUNLIGHT IS PROJECTED INTO INSIDE ROOMS BY MEANS OF REFLECTING LENSES



First installation of sunlight lighting has been completed in Paris by the newspaper "L'Intransigeant," as shown above.





Illumination of a windowless hotel or station lobby by sunbeams reflected from roof by mirrors and scattered to the ceiling by reflectors is shown in the above drawings. Arrangements of mirrors to distribute sunlight into interior rooms at various floor levels are shown in the small black and white drawing. Light can be filtered through water to absorb heat.

CURATIVE properties in the ultra-violet rays of sunlight have lately become much esteemed, resulting in such manifestations as nudist cults, therapeutic lights, sun baths, etc. And now from France comes the invention of Jacques Arthuys for carrying sunlight directly into the interiors of buildings to supply natural illumination that is both healthful and efficient.

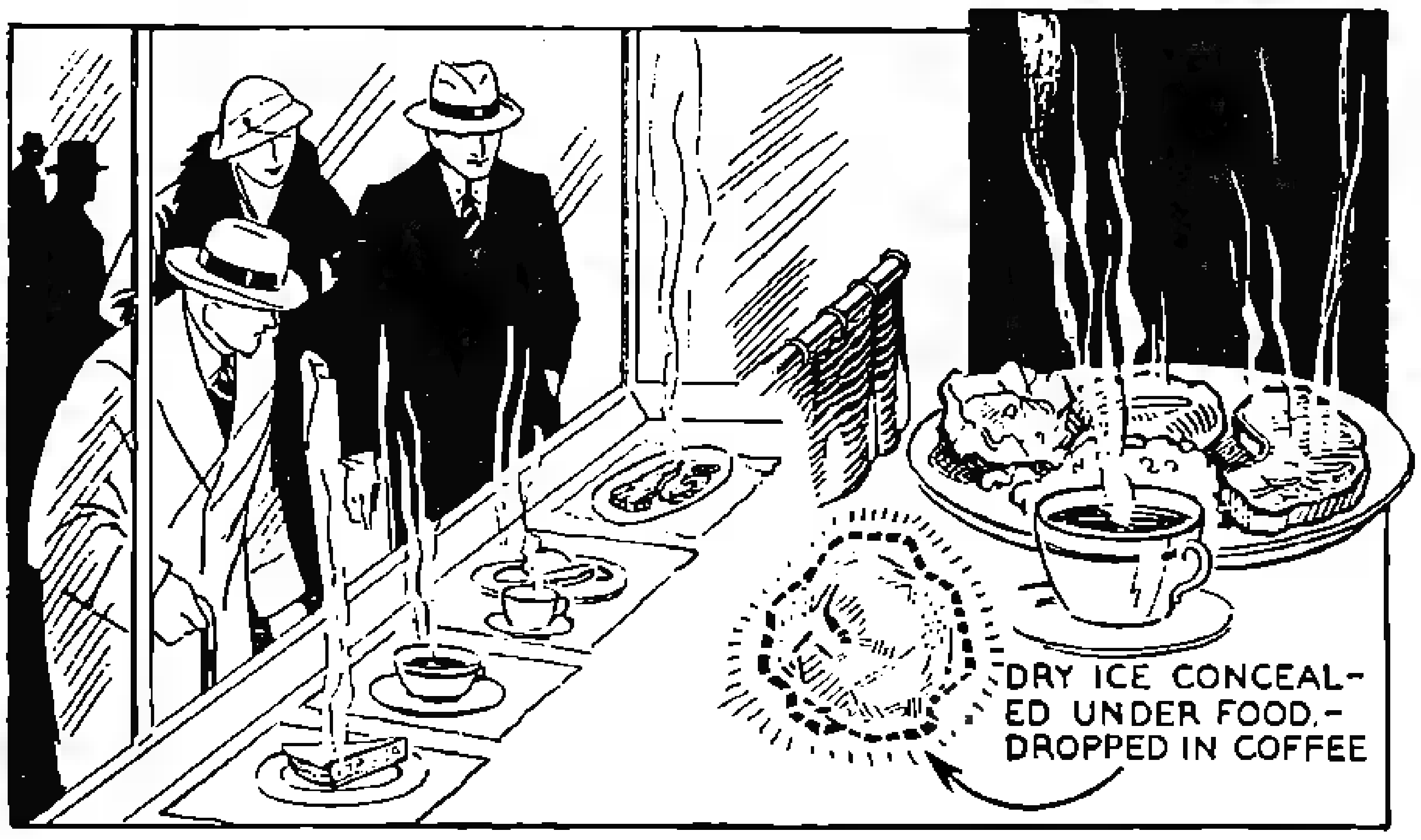
That the suggestion is more than an idea is proved by the fact that a sunlight installation has already been made in the building of L'Intransigeant, well known Paris newspaper. The photo reproduced above shows the arrangement of mirrors on the roof which reflect the light beams down a shaft, whence they are distributed into various rooms through an intricate array of lenses and reflectors.

Mechanical principles involved are simple. Two mirrors are installed on the roof, one fixed and the other movable. By means of a heat-sensitive cell, comprising an entrapped gas which expands or contracts in accordance with the light of the sun which falls upon it, which cell in turn actuates mercury contacts controlling a motor, the movable mirror is kept facing the sun from morning till night.

From the moving mirror the fixed mirror projects sunlight down a courtyard or special light well, and reflected where needed.

HANDIKINKS

Handikinks will hand you ■ surprise every month—there's always something new you haven't thought of that you can build yourself, or adapt cleverly to a new use. Look these over and discover how much you can do with simple things.

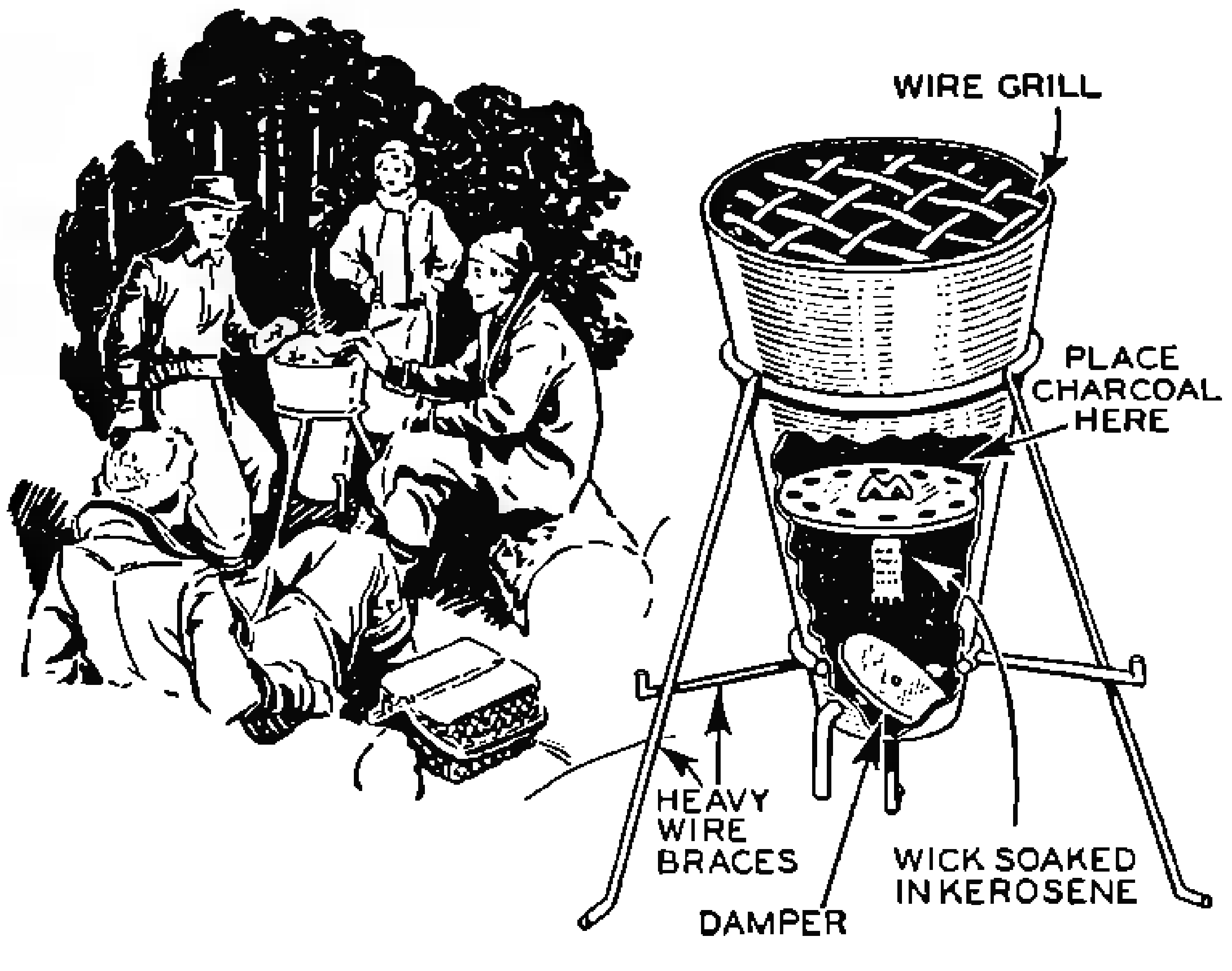

DRY ICE CONCEALED UNDER FOOD.-DROPPED IN COFFEE

Dry Ice Novelty Pulls Trade

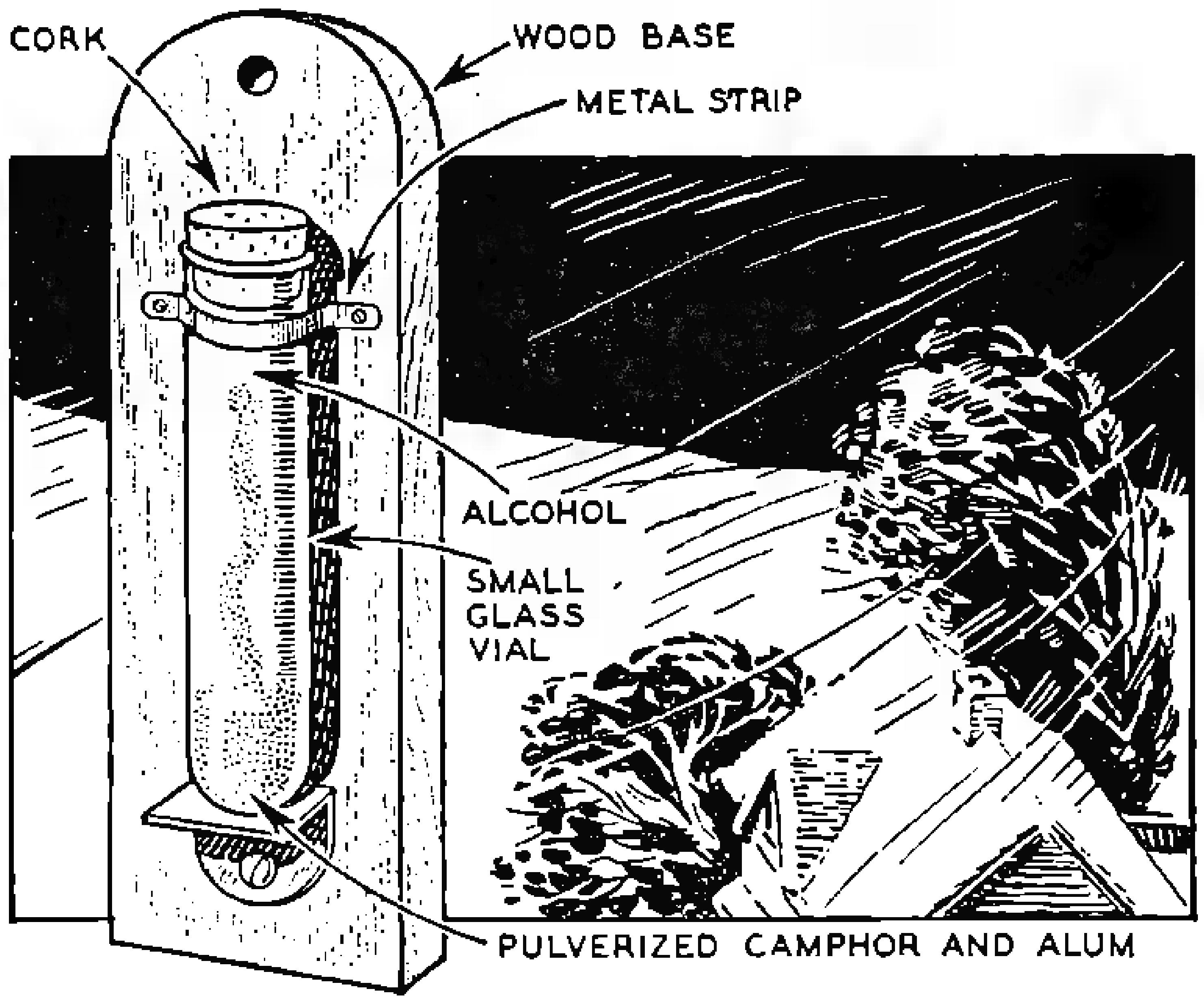
AN ENTERPRISING advertising man has a friend who owns a restaurant. This ad man persuaded the restaurateur to exhibit plates of food in his window to entice the hungry trade in. Here's the way the plates were kept "steaming" hot: Dry ice was inserted in a concealed position under the plates. The gas condensed as it hit the outside air and the moisture created looked like sizzling hot steam, attracting scores of hungry customers into the restaurant.—A. Vance.

Barbecue Pot and Home-made Barometer Fine Projects for the Mechanic

A WESTERN sportsman has invented a new type of charcoal barbecue pot for use in his own backyard. It gives ■ clean fire without smoke, and will barbecue meats to a delightful turn. The contraption stands three feet high and is fired by a kerosene soaked wick which is affixed to ■ plate on which from three to five pounds of charcoal should be placed. The charcoal fire is ready to grill meats or fish twenty minutes after the wick is lighted. A damper at the bottom regulates the draft which may be adjusted for slow or fast cooking. The pot will take a six pound roast which may be grilled in one hour with three pounds of charcoal. Five pounds of fuel will last three hours and will leave no mess of fuel to clean up afterwards. A removable grill is provided for grilling over coals. There is no danger of starting a fire by blowing cinders or glowing embers. The gadget is easily portable for treats in camp.—Gilson Willets.



You can have barbecued meat right in your own backyard if you construct this pot according ■ directions.



ANOTHER thing which the home handy man can build without much fuss and which will repay tenfold the time spent upon it is ■ home-made barometer. Here's the way to make it. A base of wood is cut about 6 inches long and ½" thick as shown in the sketch. The edges can be beveled to give a neat appearance.

A small glass vial or test tube is mounted in the center of this base by means of two brackets. A cork with ■ small hole drilled through the center is inserted into the top of the vial.

One-eighth of an oz. of alum and ⅛ oz. of camphor both pulverized very finely, are put into the vial which is then filled with pure grain alcohol.

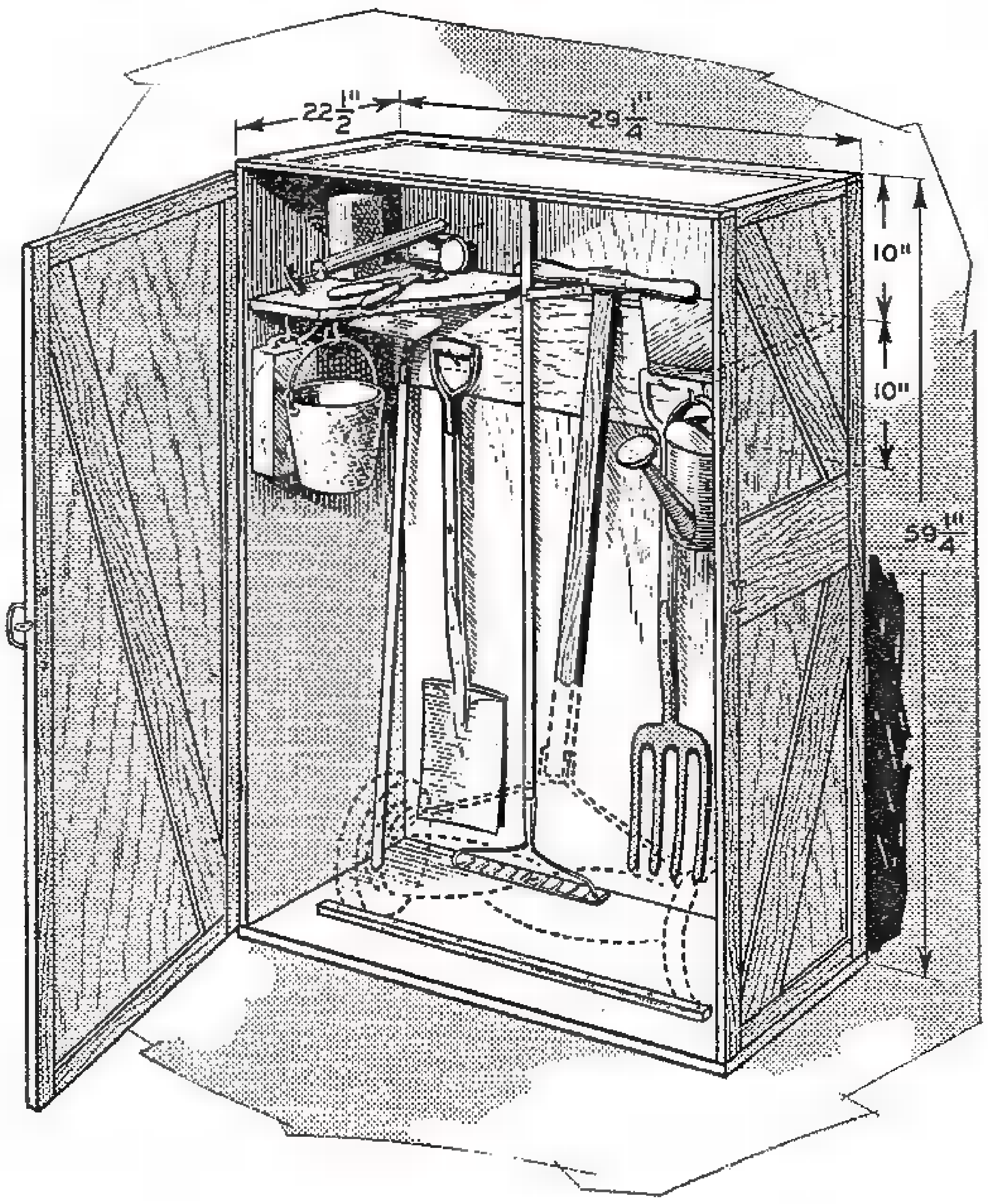
When the weather is clear the alcohol will be clear, but if it is to be stormy, the alum and camphor rise to the center of the vial in the form of a spiral cloud. The wooden base can be stained or varnished as desired.

Handy Gadgets for the Gardener

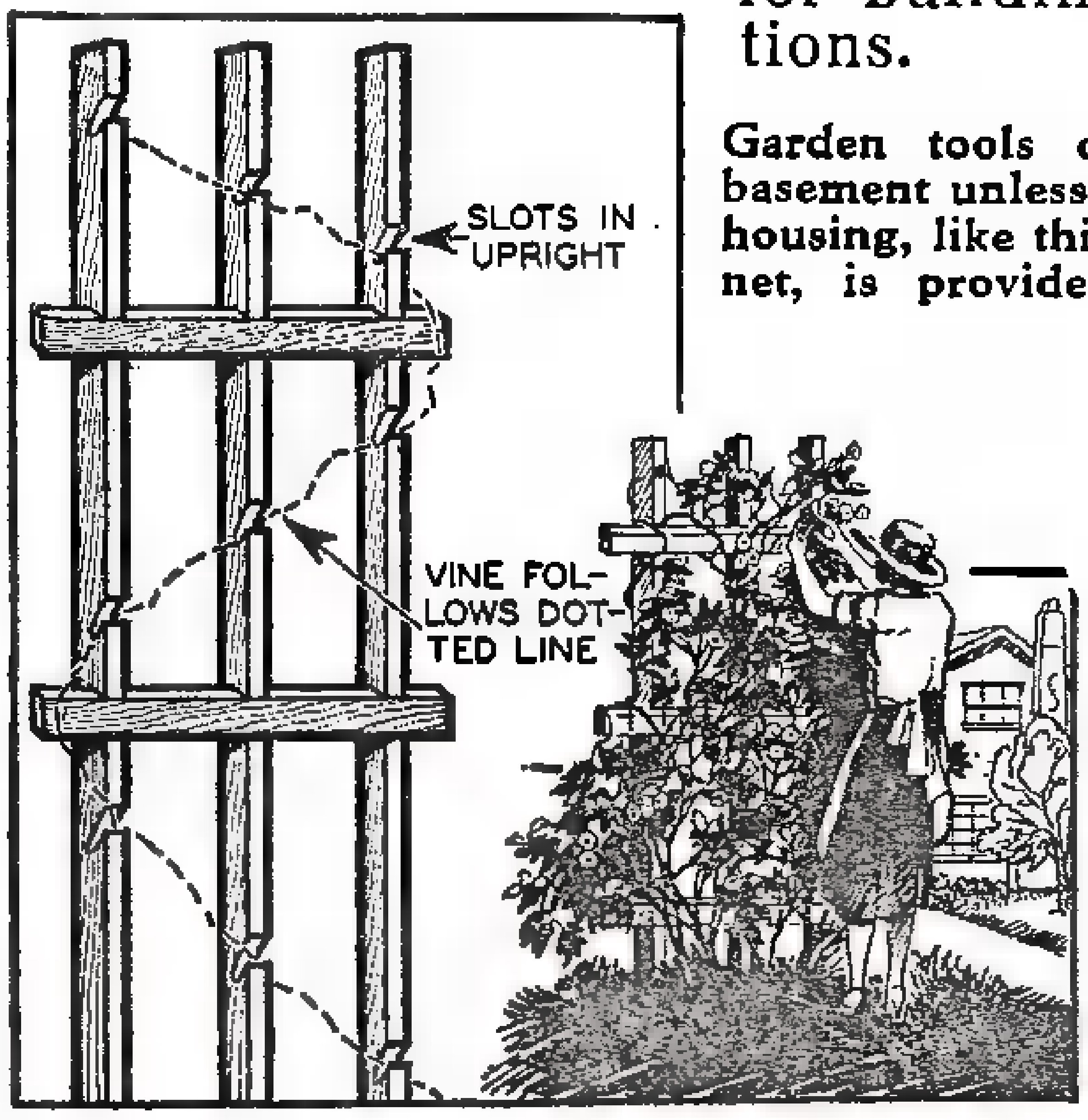
Handy Cabinet Keeps Tools Clean

WITH the beginning of grass cutting there always comes up the problem of keeping the lawnmower, rake, clippers and other grass implements. In addition the usual garden tools are not easy to keep neatly in the ordinary home. If kept in the cellar there is always the problem of returning them to the "roost" after using when one is tired, and it is a burden as well to bring a lot of them upstairs before starting work. If they are kept on a back porch that is likely to become dirty and is likely to be littered with the tools in a short time.

A smart way to work this out is to build a little cabinet out of fir veneer, and keep it outdoors on the back porch or near the house during the garden season, or in the garage, and then take it in for the winter. This departmentalizes the work. See sketch for building suggestions.



Garden tools dirty up the basement unless some sort of housing, like this handy cabinet, is provided for them.

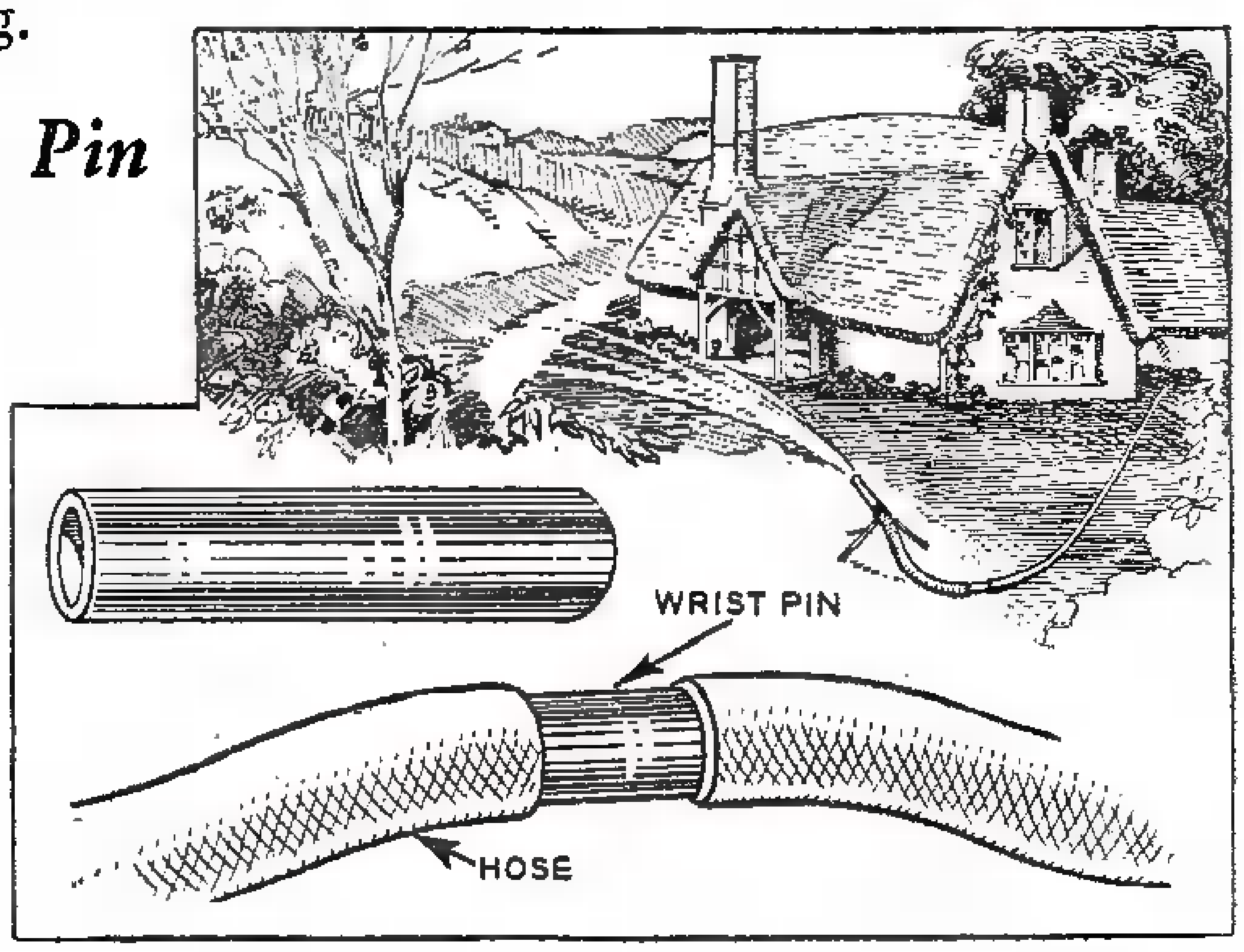


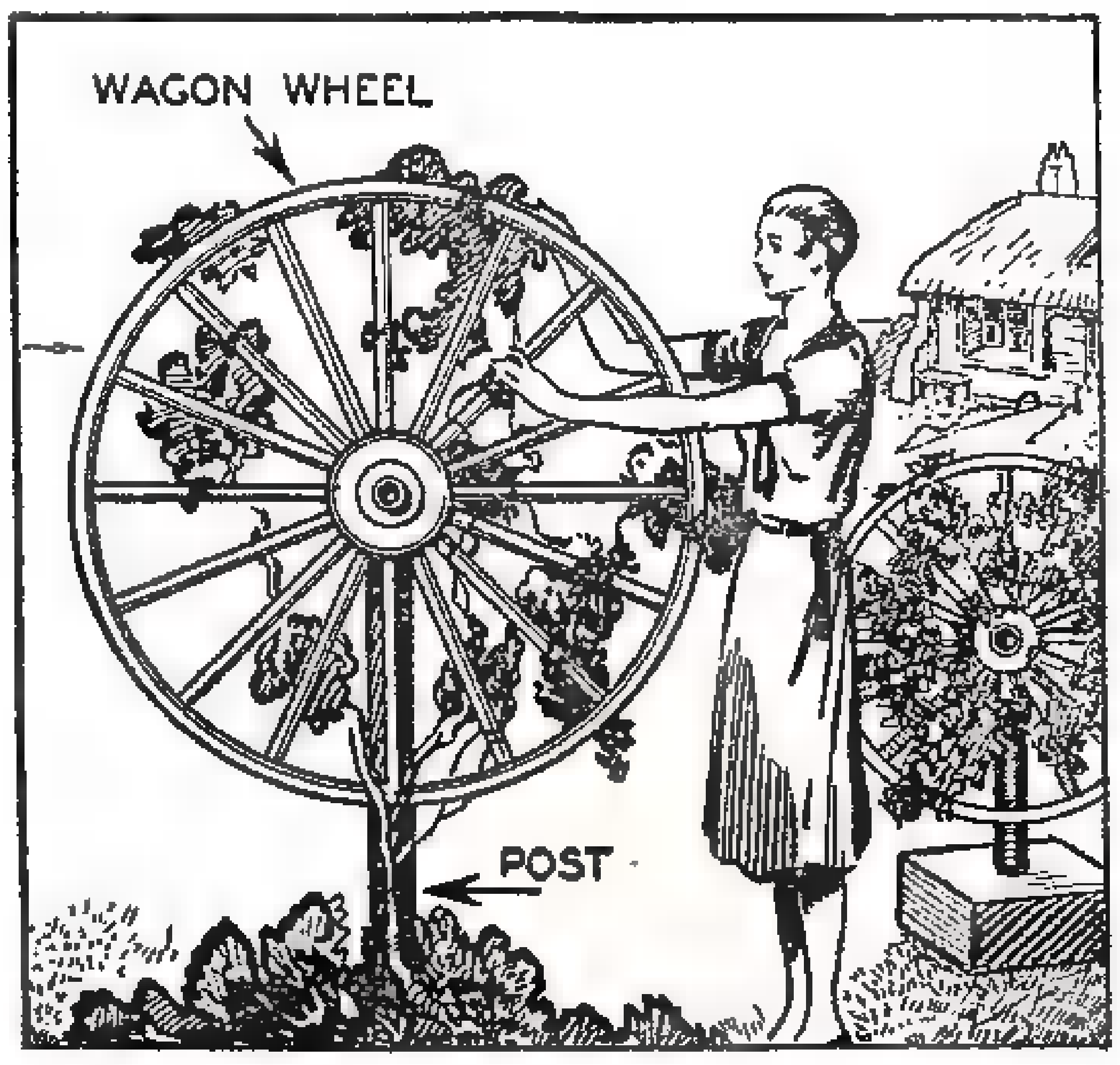
This Notched Trellis Trains Climbing Vines

MANY kinds of clips or fasteners have been designed by home gardeners to hold climbing vines in place upon a trellis and to aid in training the vine the way it should grow for greatest efficiency; but it has remained for a Wisconsin carpenter to conceive the simple and self contained fastening device shown herewith. Entirely eliminating the rubber bands, strings and spring clips, he merely saws a slanting slot in the standard of the trellis spacing them apart as indicated. These slots are then smoothed by sanding.

Garden Hose Is Mended With Piston Pin

LEAKY garden hose can readily be mended by cutting the hose in two at the point there is a leak, and inserting a model T Ford wrist pin using it as a means to rejoin the sections. The piston pin makes such a snug fit that it hardly requires a hose clamp to keep it from leaking. The idea can also be used to join to the sections other sections, when no coupling of the ordinary kind is available or when it is necessary to lengthen.

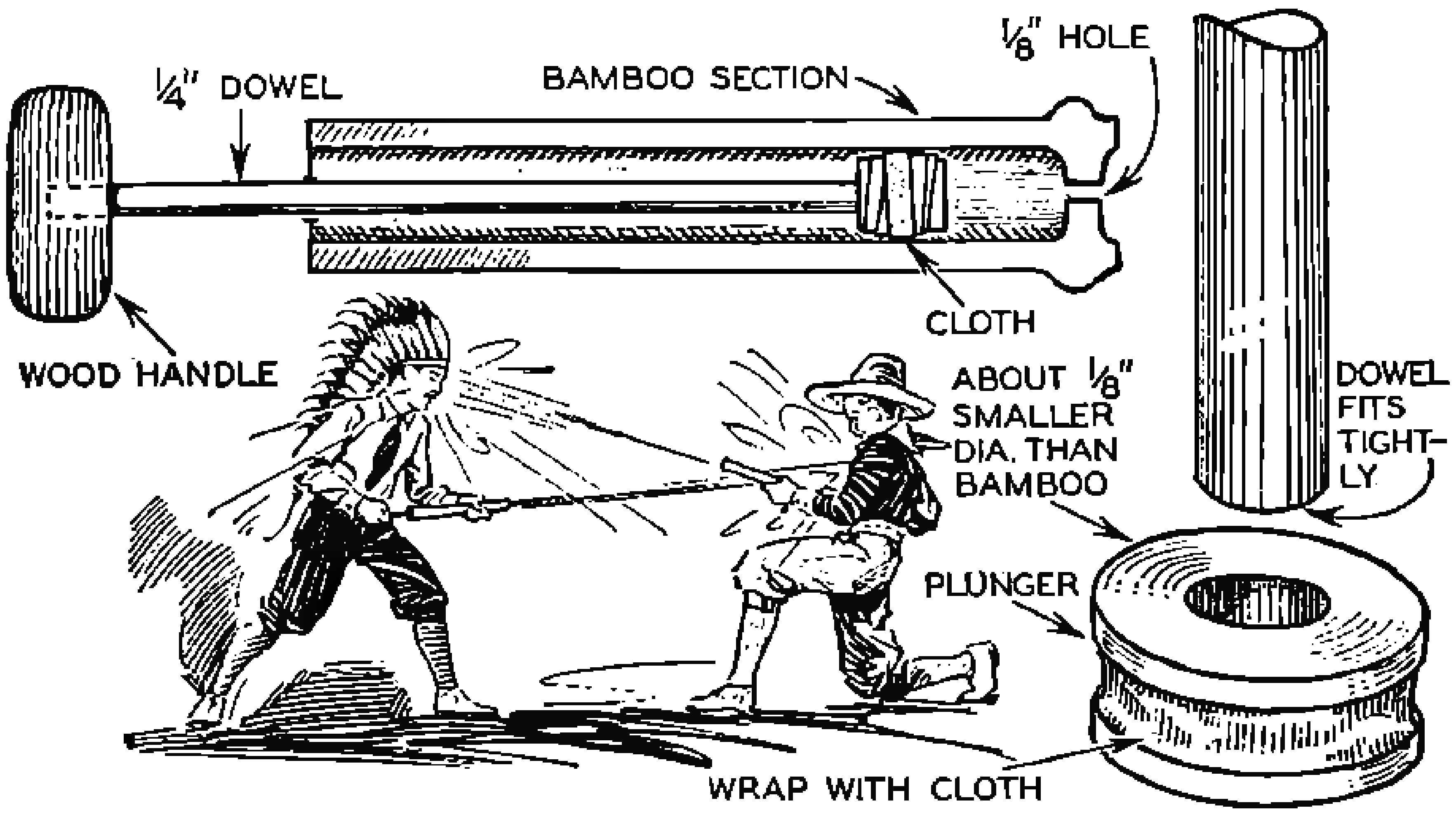




Novel Trellis Formed by Wagon Wheel on Post

A VERY decorative idea for the garden is found in the use for an old wagon wheel as shown in the drawings to the side here. If one grows sunflowers this wheel with its climbing morning glories will imitate a huge sunflower in the garden, or for more practical uses it can serve as a trellis for other kinds of climbing vines. About the farmyard it makes a fine thing against which to grow ivy or woodbine. All that is needed is a wheel outworn in its usefulness, and a pot with a bolt through it to form an axle.

Putting Old Things to New Uses



Squirt Gun From Fishpole

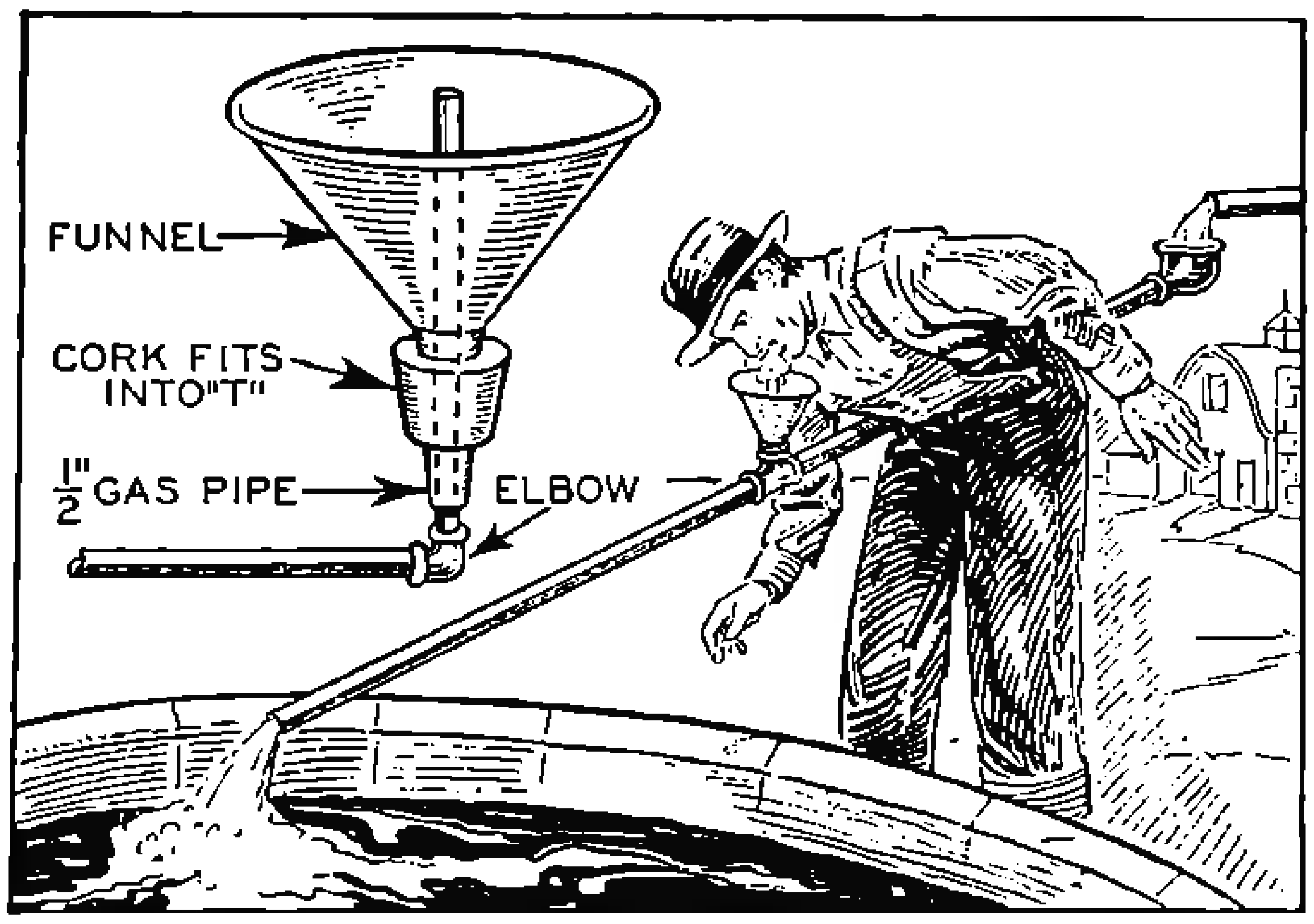
A FINE little squirt gun which will give to youngsters endless hours of fun can be made from an ordinary bamboo fishpole. You pick a section (see drawing) and saw it off behind one of the phalanges of the pole, leaving one end in the section closed. Be sure the section picked is even and tubular. A small piston or swab is made out of white pine. The dowel is put in the piston as the drawing shows. A small hole, about 1/8", is drilled in the end.—Don Coolbauer.

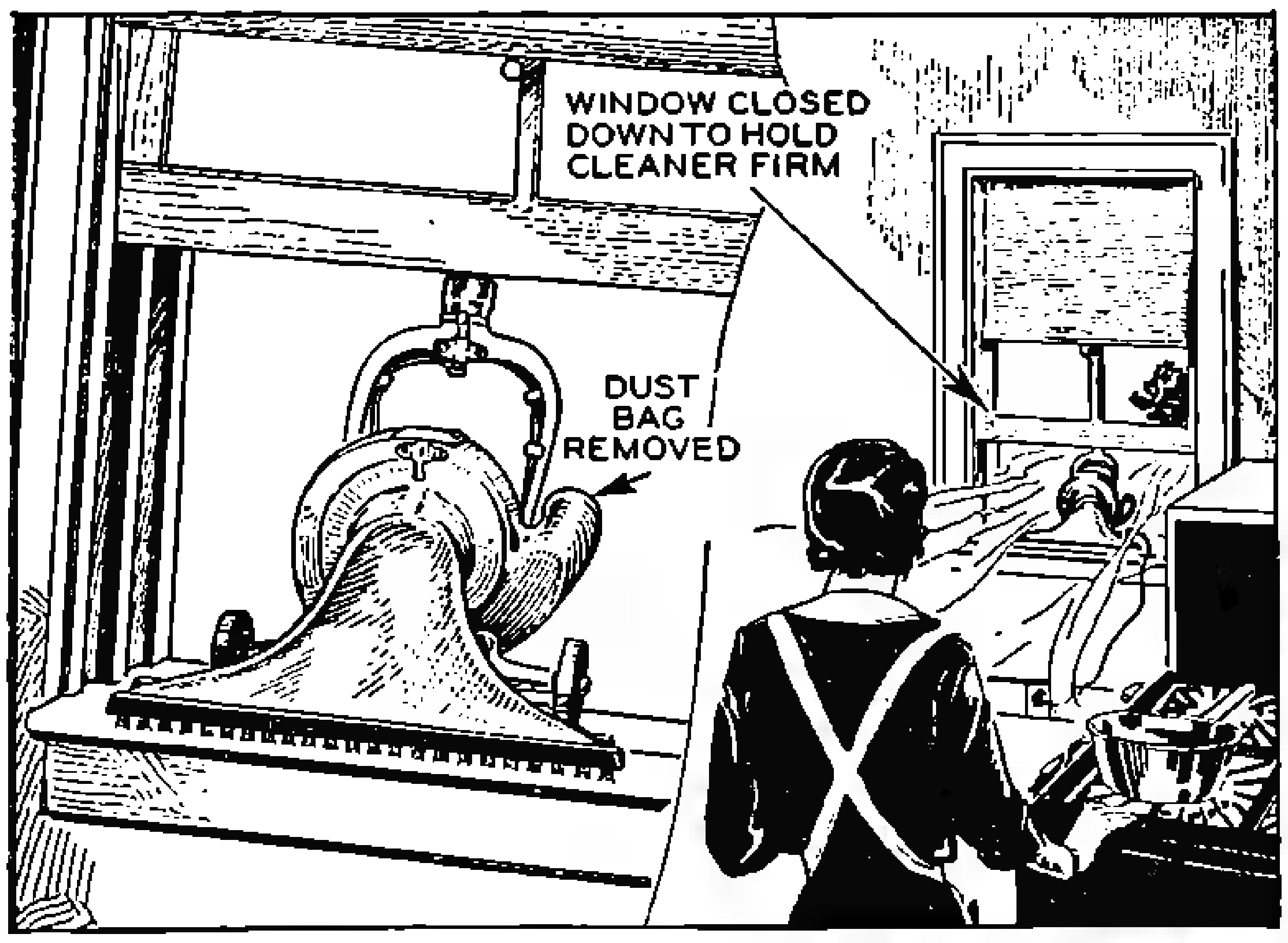
Windmill Water Fountain Saves Cup

DISPENSING with the family drinking cup at the windmill pump, a Wisconsin farmer substituted a sanitary drinking fountain which he constructed from a funnel, a large cork and some 1/2" gaspipe fittings.

The gaspipe pieces, 8" long, were fitted into an elbow as shown, and one arm of the L was slipped into a T located in the delivery pipe of the pump. Part of the water in the large pipe is caught, collected by the funnel, and returned to the delivery.

On farms where the well is shallow and the water is run into [illegible] stock tank, such a device as this will help to aerate the water and prevent the forming of mold in the tank.—Walter Brixius.




WINDOW CLOSED DOWN TO HOLD CLEANER FIRM
DUST BAG REMOVED

Vacuum Cleaner Ventilates Kitchen

A QUICK and efficient method of removing objectionable odors from the kitchen after cooking certain vegetables is described as follows:

Open two windows or a door and a window at opposite sides of the room. Remove the dust bag from your vacuum cleaner and place the cleaner on the window ledge with the suction end in the room and the opening to which normally the dust bag is attached outside the window. Close the window snug against the top of the cleaner in order to hold it rigidly in position and start the motor. Within from three to five minutes the room will be completely ventilated and free from odor.—F. Oliver Gebhart.

Use Dry Ice to Carbonate Beverages Bottled Right at Home

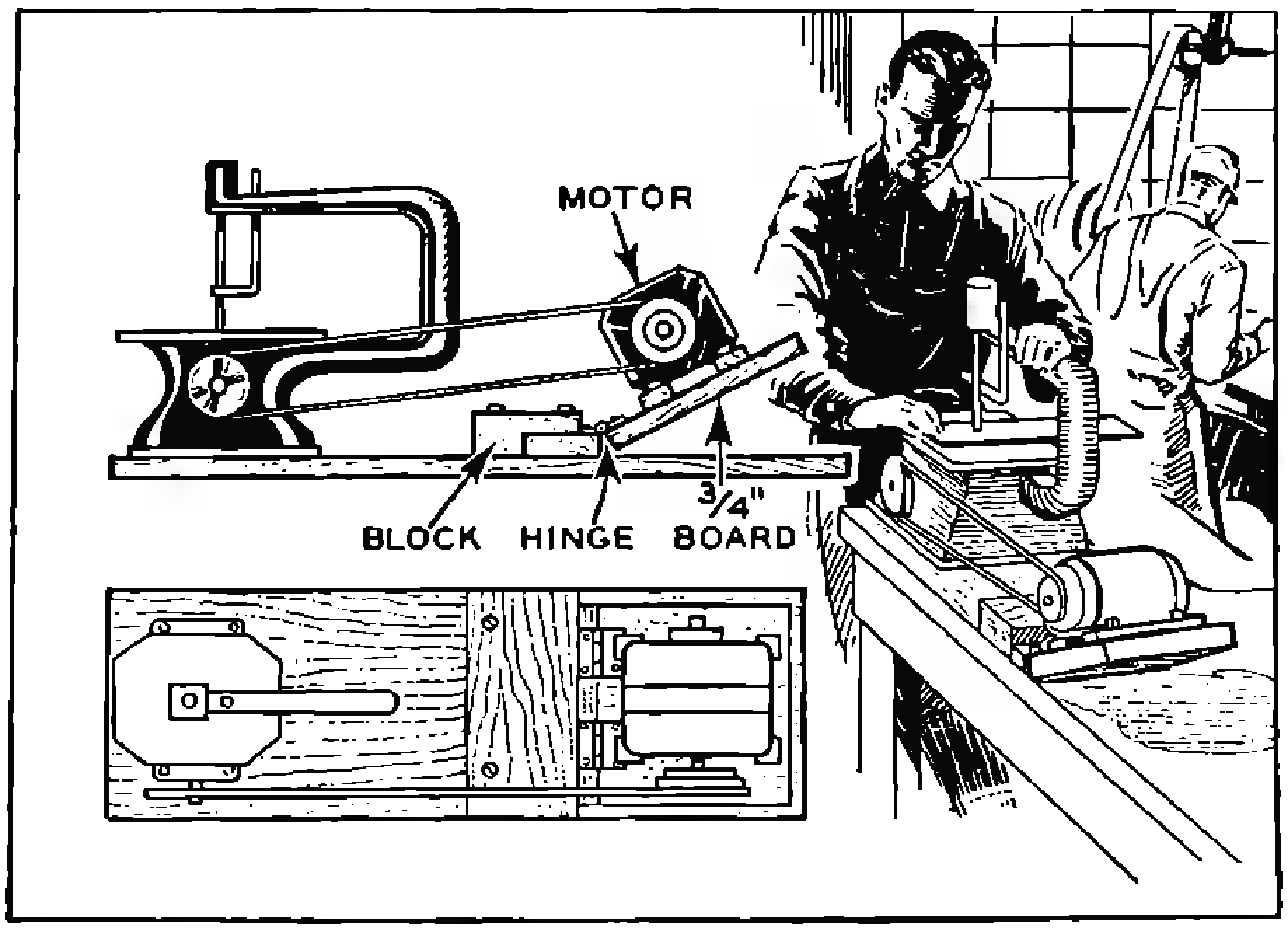
WHAT with the introduction of home bottling equipment induced by the 18th amendment, nearly every home has [illegible] bottle capper and equipment for putting the lids on bottles. Also almost every ice cream manufacturer and soda fountain sells dry ice, which is nothing but carbonic acid gas frozen up. With a bottler and a piece of dry ice, you can carbonize your own beverages at home. Ordinary nectars, for which powders are sold, can be made, sweetened to taste, and a piece of dry ice the size of a walnut dropped in with the mixture just before the cap is put on. Care and experiment must be exercised in the matter of putting the ice in. It's 800 times condensed gas.—M. Bolstad.

Dry ice is merely the frozen gas used in carbonating beverages of the soft drink variety. It [illegible] be used [illegible] home.

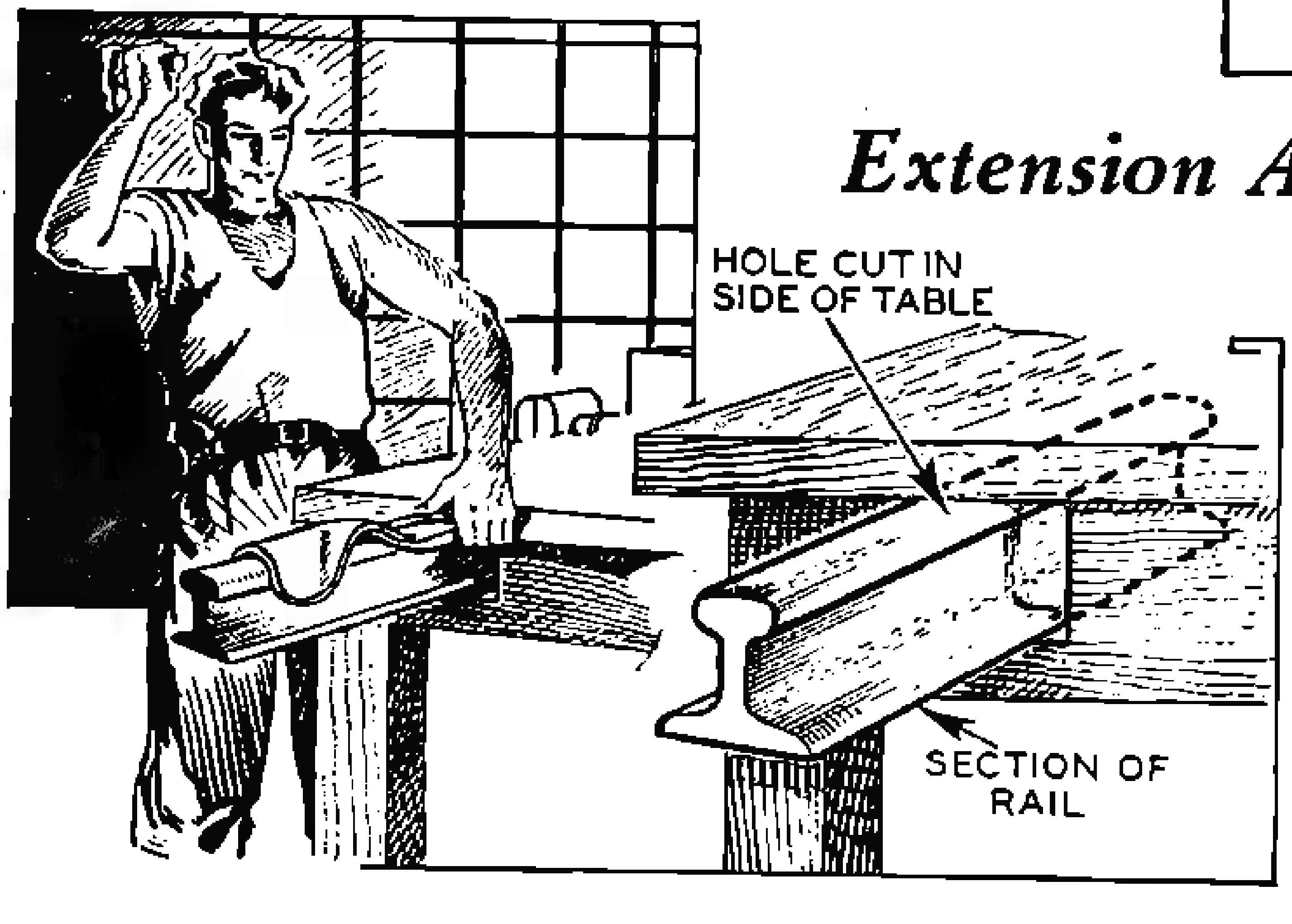
Helpful Hints for the Home Shop

A Motor Drive Mounting

MANY home workshops are of insufficient size to permit the installation of a drive shaft for power take-offs necessary for the various tools such as jig saws, circular saw, drill press, etc. The necessity of such shafts is done away with by putting a small block of ¾" material behind each tool, and mounting the motor on another similar block at an angle behind it. Thus the motor can be shifted to each tool, the tension on the belt keeps it in line and gives traction.—H. R. Stevenson.



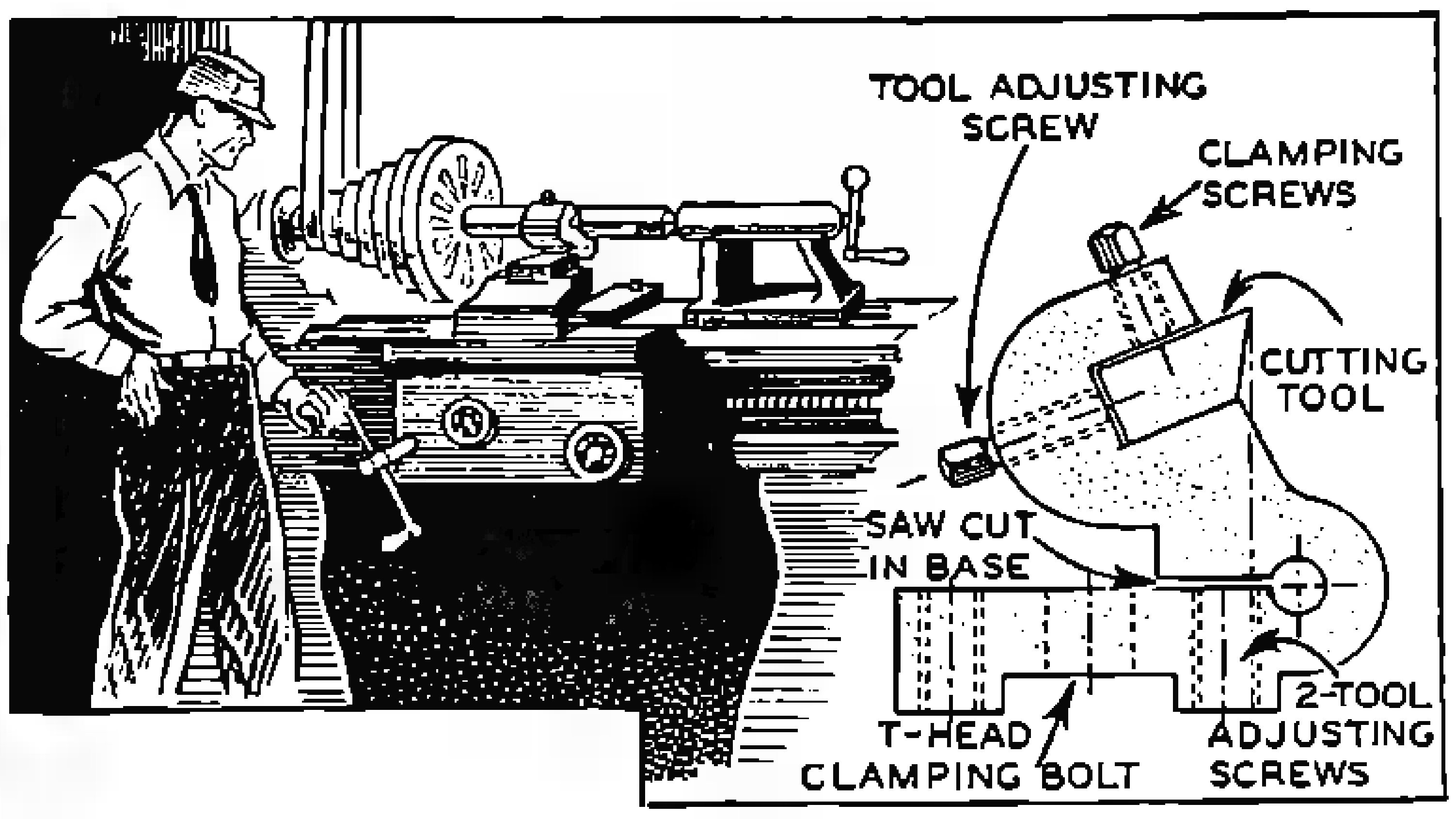
Extension Anvil Makes Riveting and Molding Easy


HOLE CUT IN SIDE OF TABLE
SECTION OF RAIL

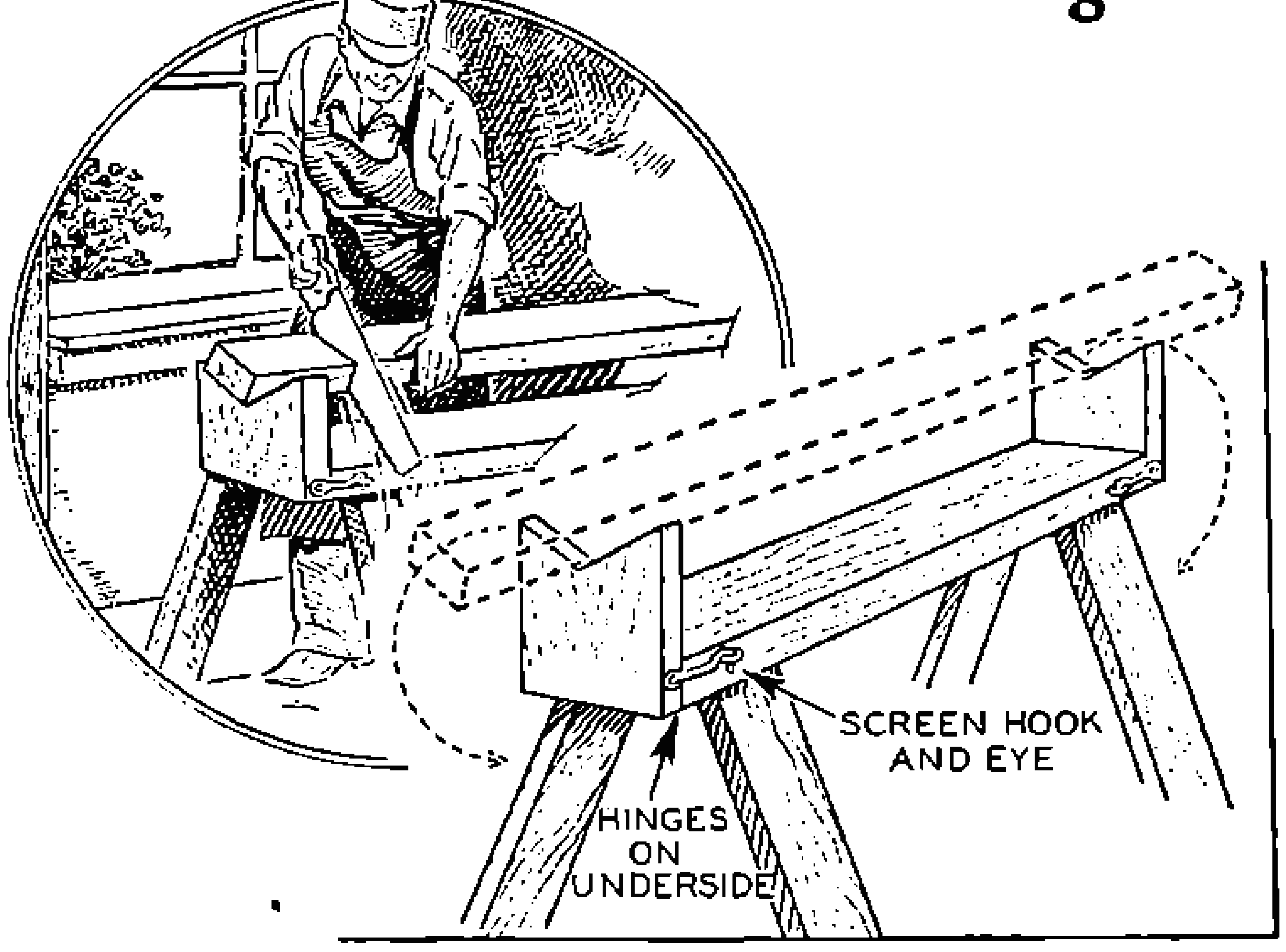
IN DOING many jobs of riveting and nailing, it is often hard to get at the regular bench anvil with the work. A length of old railroad iron made to slide into a hole in the end of the workbench as shown will be found handy where a nailing and a riveting foil is needed. When not in use the iron is pushed out of the way. This idea can be elaborated upon by adapting a leather pad over the end, filled with shot. Thus a soft anvil can be made which will serve well in making up bent metal like automobile bodies.—L. P. Young.

Finishing Tool Sprung for Taking Light Cuts Does Very Fine Work

CUTTERS and tools require rigid support, this too as close to the cutting edge as is practicable but on certain finishing operations, especially on quantity work done in the turret lathe and similar production tools, an absolutely rigid support is undesirable and often produces chatter. What is wanted for such work is maximum support close to the cutting edge, plus a limited amount of yielding. This can be accomplished with the rest I have devised. Make a casting for the rest as the drawing shows, drill and slot it.—Morris A. Hall.

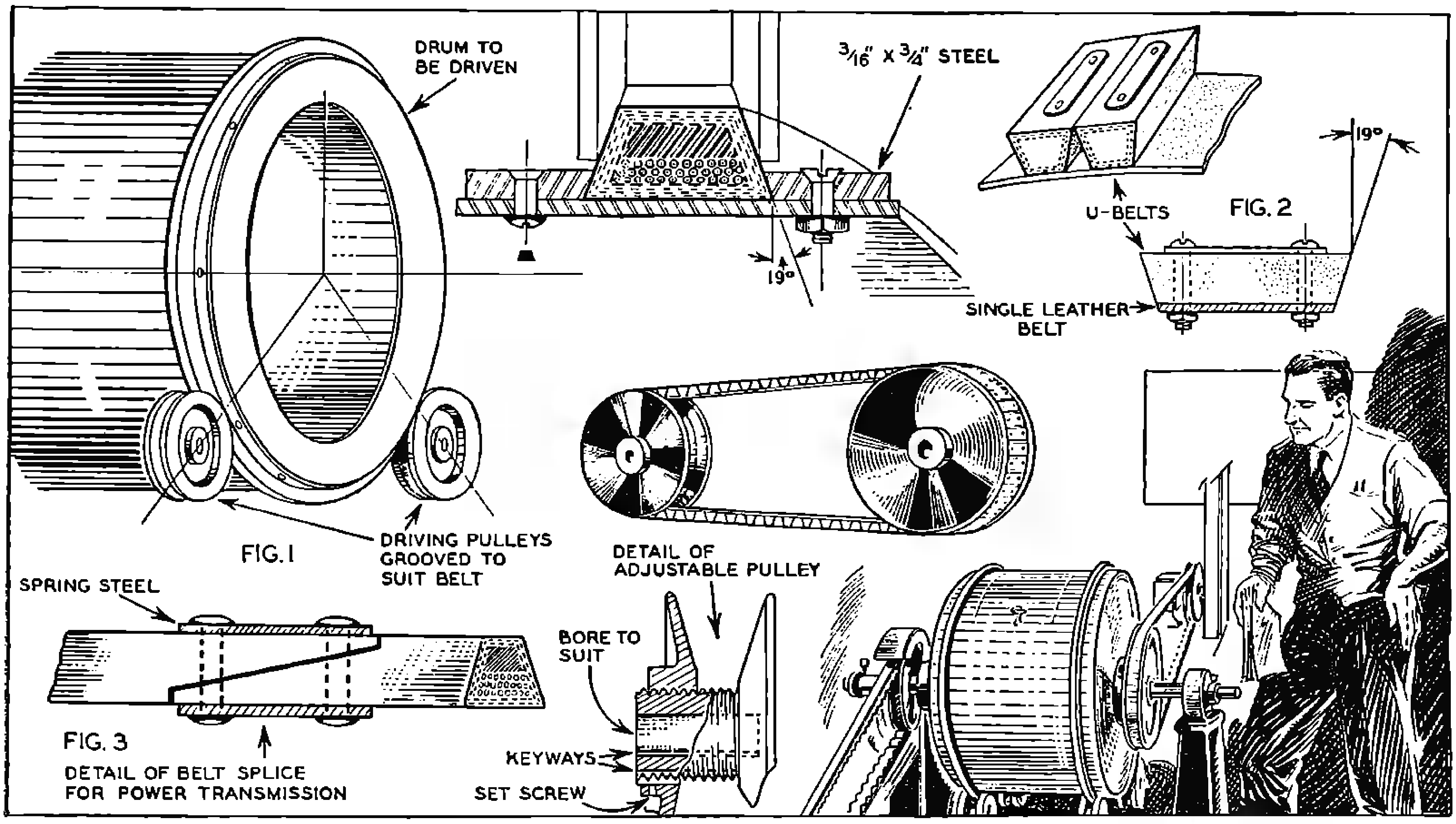


Sawing Blocks Add Convenience to Saw Horses



WHEN occasion arises for doing considerable cross sawing of boards in the workshop it is often tiresome to hold each board firmly in position upon the ordinary type of sawhorse; and the same will be considerably improved by the addition of the hinged end pieces, as shown. These when swung up in the position indicated by the drawing provide a firm support for the boards. They are quickly released to drop out of the way when not in use. They do not interfere with the normal function of the sawhorse and are very easy to make and install. The attachment is especially handy for working with round objects such as poles and rods.—G. E. Hendrickson.

Clever Shop Kinks for Mechanics


DRUM TO BE DRIVEN
3/16" x 3/4" STEEL
19°
U-BELTS
FIG. 2
19°
SINGLE LEATHER BELT
FIG. I
DRIVING PULLEYS GROOVED TO SUIT BELT
DETAIL OF ADJUSTABLE PULLEY
SPRING STEEL
BORE TO SUIT
KEYWAYS
SET SCREW
FIG. 3
DETAIL OF BELT SPLICE FOR POWER TRANSMISSION

A number of uses for old V-belts are suggested in the above drawing. For rotating a drum or screen, V-belt is attached to circumference and driven by grooved pulleys. Variable speed drive made by assembling V-belts crosswise as shown.

DISCARDED V-belts used for industrial drives which have been replaced because of wear, can be adapted for many uses around the shop. For driving a rotating drum, which may be a screen, tumbling barrel, dryer for photographs or blueprints, or used for some other purpose, a length of V-belt is fastened to the circumference of the drum.

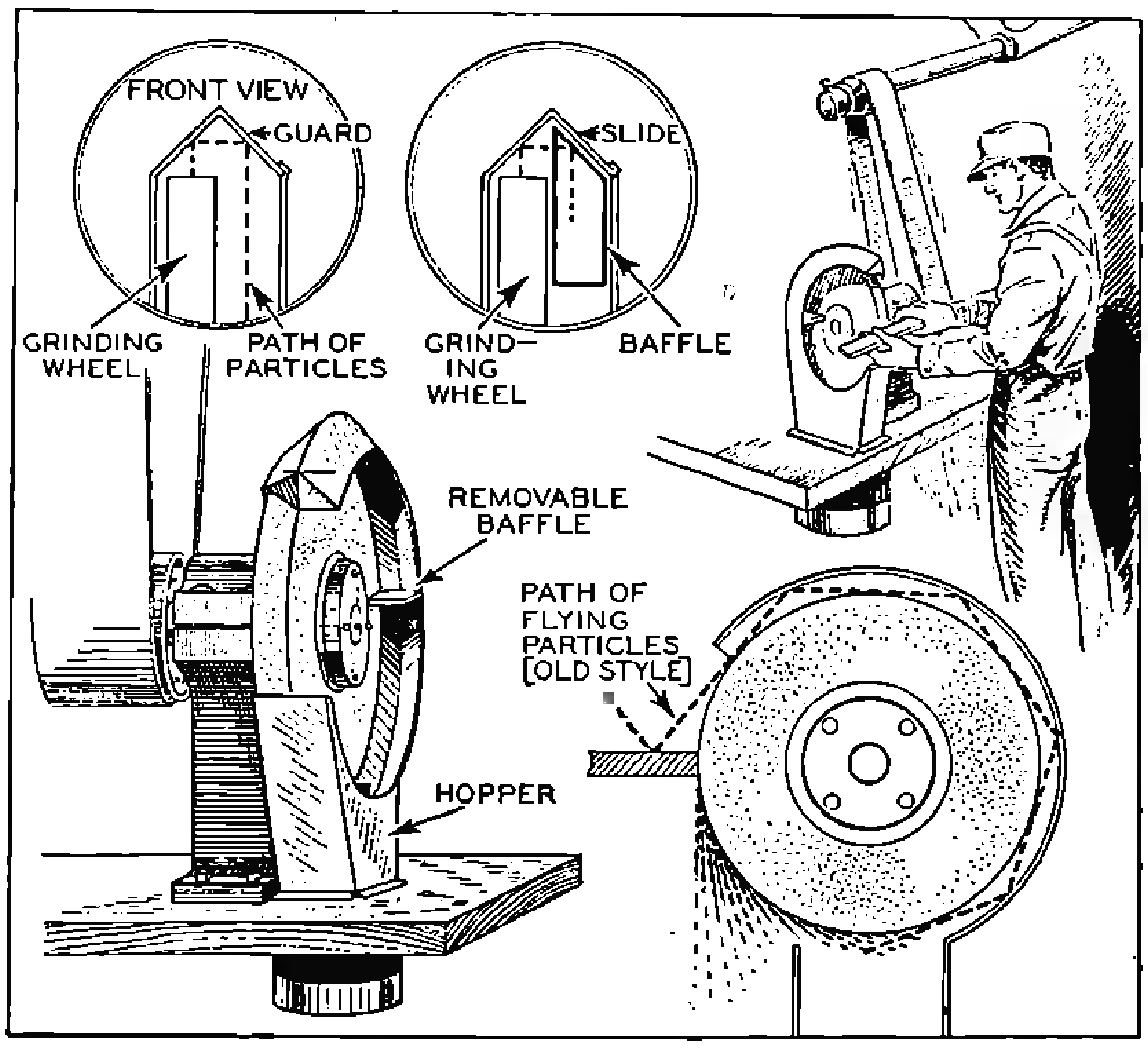
Two small driving pulleys, grooved to fit the belt, are set at 30 degrees each side of the bottom center of the drum. These pulleys may be driven by a chain, giving a positive means of rotating the drum. A detail drawing shows fastening of belt to drum. A band of steel, tapered on one side to same angle as the belt, is riveted to drum; then belt is put in place, and a second steel strip drawn in place with bolts.

A variable speed drive can be made of V-belts cut into short lengths and fastened crosswise to a leather belt with rivets or machine screws. Detail drawing shows adjustable pulley, the hub and one face of which are integral. Threads and a keyway are cut in the hub to allow other face to be properly adjusted for diameter. A method of splicing belts is shown.—Albert Hack.

Spark Deflector for Emery Wheel Protects Eyes, Helps Keep Shop Clean

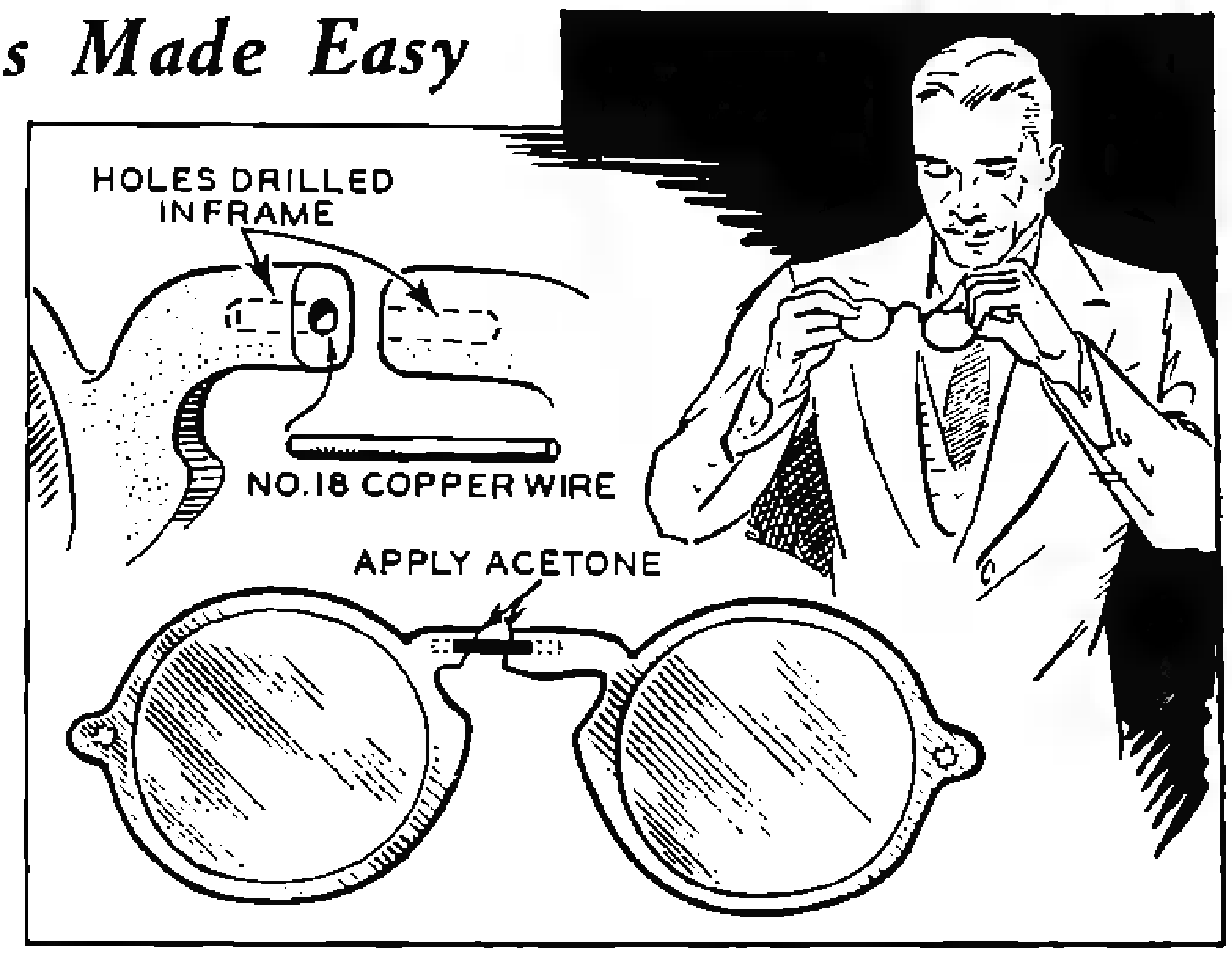
ORDINARY emery wheel guards are comparatively inefficient in protecting the eyes from sparks, because by a series of rebounds the flying particles emerge at a dangerous angle, as indicated in the lower corner of the drawing at the right. A combination of a double angle guard twice the width of the wheel, and a set of baffle plates, disposes of the particles safely.

The guard has a V-shaped top section, the wheel occupying but half this width, on one side. The outer half is left open to catch flying particles and divert them through the hopper. A baffle plate, stretching almost to the hub of the wheel, is not reduced in efficiency when the diameter of the wheel decreases with wear, as is the case with ordinary guard baffles. Construction details will become clear if the drawing is studied. The guard can be readily patterned from sheet iron and assembled by electric welding or cleating.


FRONT VIEW
GUARD
SLIDE
GRINDING WHEEL
PATH OF PARTICLES
GRINDING WHEEL
BAFFLE
REMOVABLE BAFFLE
PATH OF FLYING PARTICLES [OLD STYLE]
HOPPER

Mending Kinks for the Thrifty

Repairing Celluloid Spectacle Frames Made Easy



IT IS generally believed that when a pair of celluloid spectacles become broken that there is nothing to do about it, for most glues are untrustworthy where celluloid is concerned. A good method of repair has been found with acetone, backed with a dowel to take bending stresses.

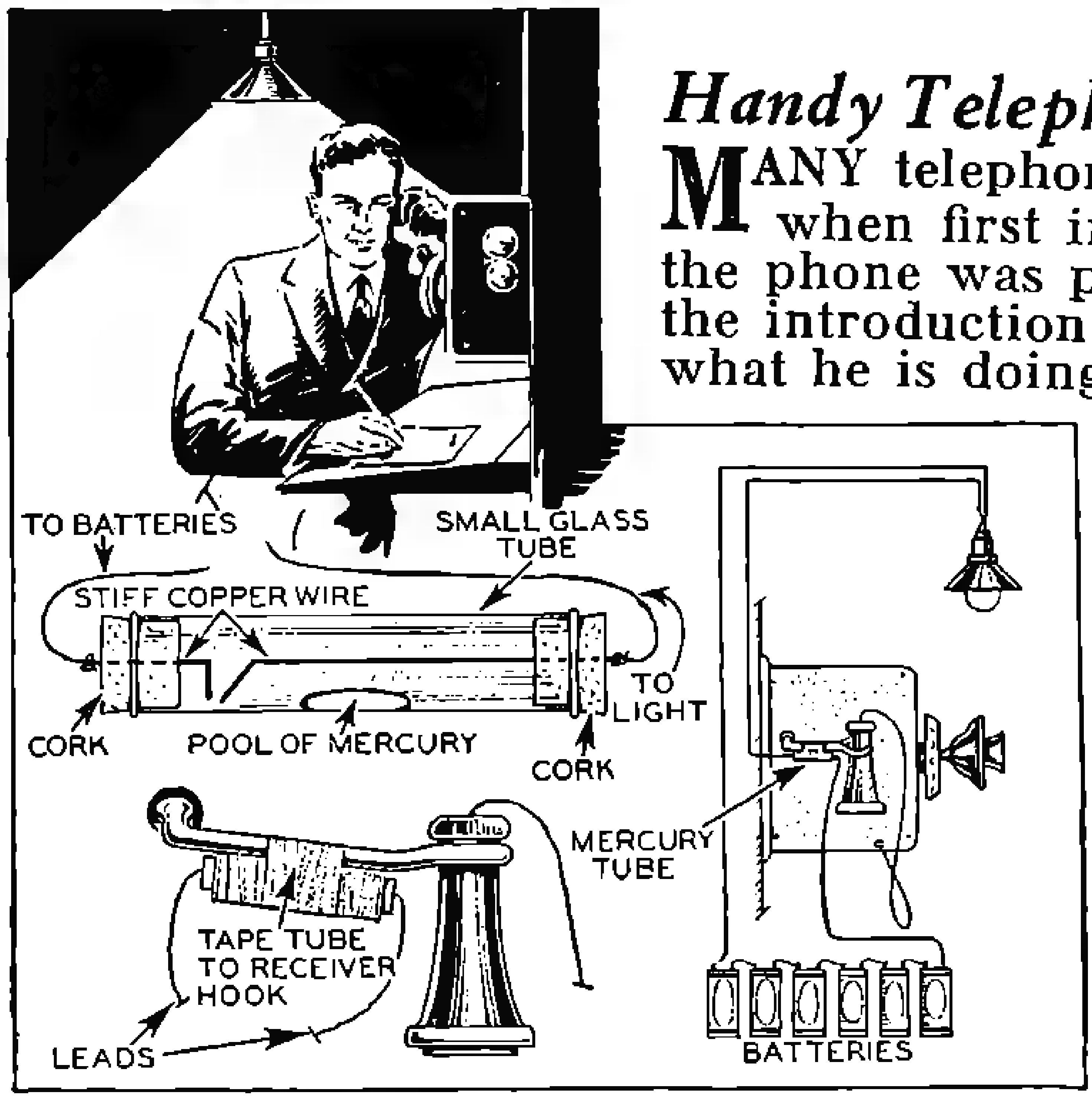
A small hole is drilled for a piece of copper or iron wire. The fit is made close. Then a small quantity of acetone, applied with a toothpick, is applied drop by drop until the ends of the spectacles are softened. When they become sticky the ends are pressed together on the dowel and allowed several hours to harden.—Claude Sessions.

Handy Telephone Light Goes on When You Need It

MANY telephones are still in the dark places they were put when first installed. It didn't matter in those days where the phone was placed as long as it was out of the way. With the introduction of the dial system however, one needs to see what he is doing. Here is a phone light which fills the bill in an ideal way. It works on a 6 volt current source (doorbell transformer or dry cells)—it goes on when the receiver is lifted and is automatically shut off when the receiver is hung up. A 6 volt lamp of Christmas tree size is used on a Christmas tree type socket. Either bell or floor lamp wire is suitable.

The switch which does the trick is made of a small vial with wires disposed a bit apart in the end which will dip down when the hook is lifted, contains a little pool of mercury which makes an ideal switch for turning the current on.

This vial is taped onto the hook as the drawing shows and the light is turned on or off as needed.—Andrew Vena.

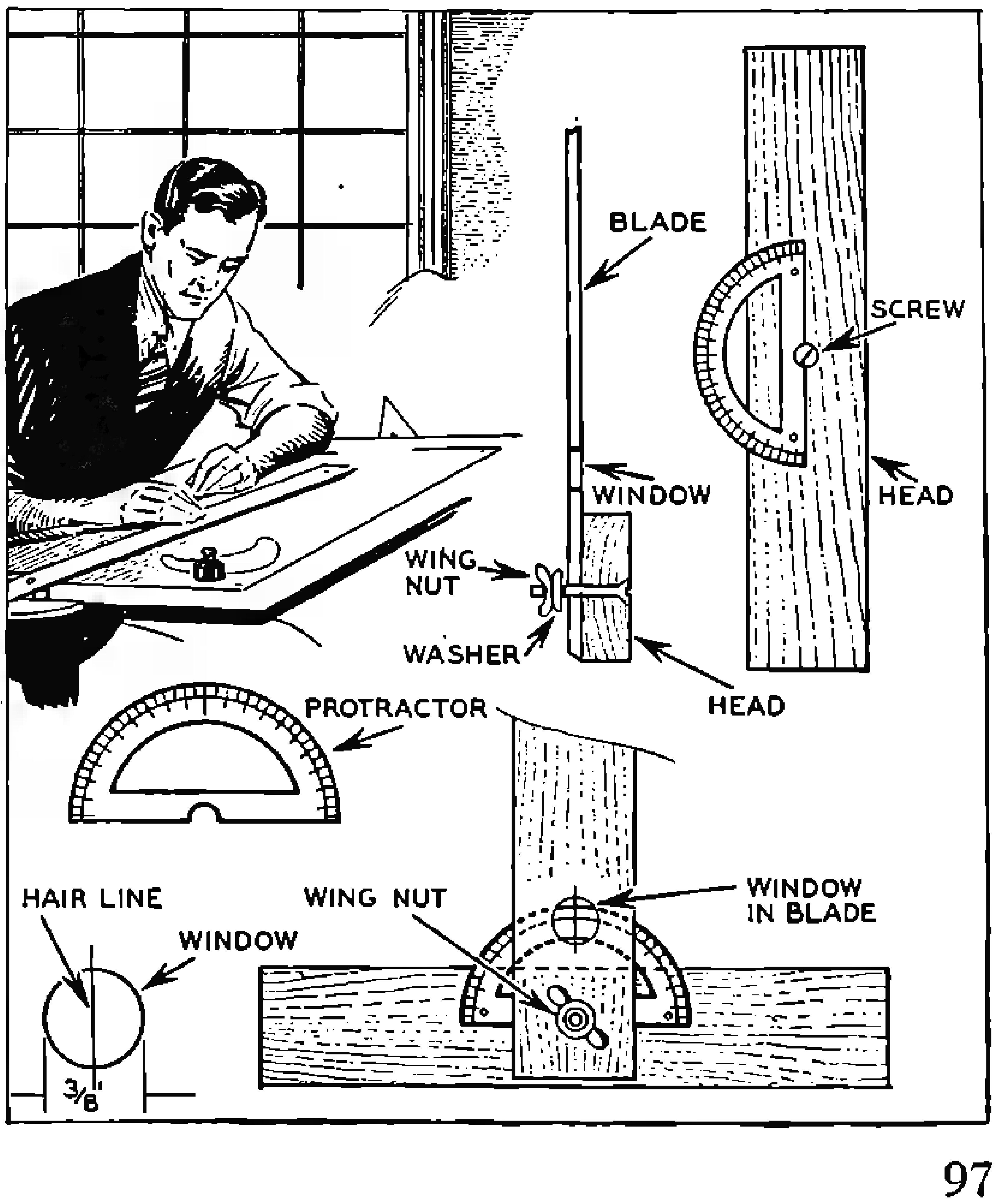


Many telephones need a light which goes on when the hook is lifted, and goes off again when through talking.

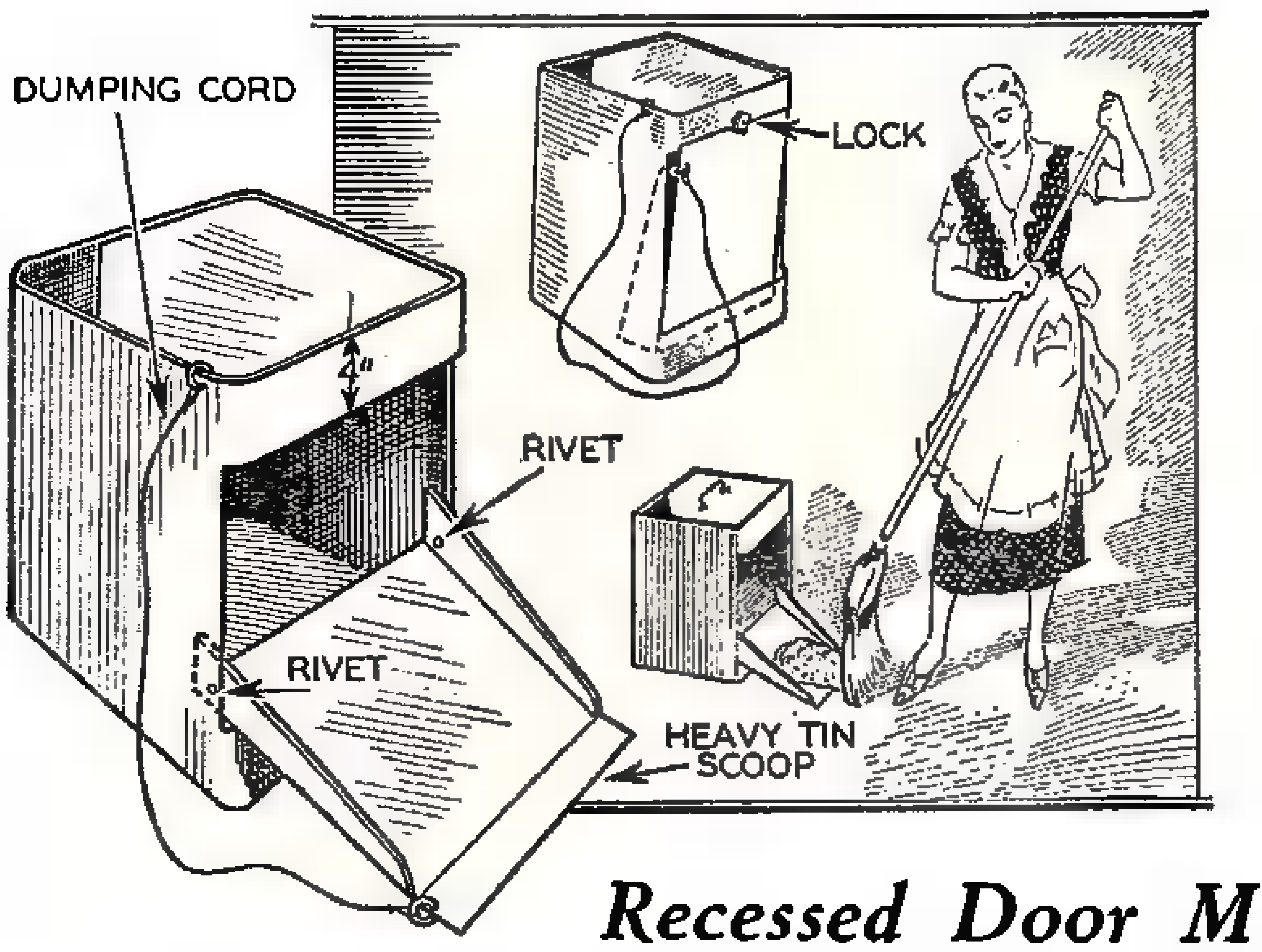
Doubles T-square Usefulness

BY USING a protractor and a 3/16 in. flat head machine screw and a wing nut, a practical and time saving tool for the draftsman is made. While the blade and head are still fastened together, drill a 3/16 in. hole through both, in the exact center. Remove the four small wood screws and fasten the protractor in place, first filing a half round hole in the exact center of the straight edge of protractor, the depth of hole being half the width of the screw in head of "T" square. Cut a ⅜ in. hole in blade as shown and fit in a celluloid window, put on washer and wing nut. At 90 degrees draw a line across the celluloid window in the exact middle line of the blade. Any degree you want shows accurately in the window.

A square like this one is of a great deal of use to men preparing insurance charts and graphs, as well as to makers of maps. A traverse on a county line can be set and maintained while compass points do not change. Slopes of curves of nomographic charts are maintained without trouble when once set.



Handy Home Kinks for Housewives

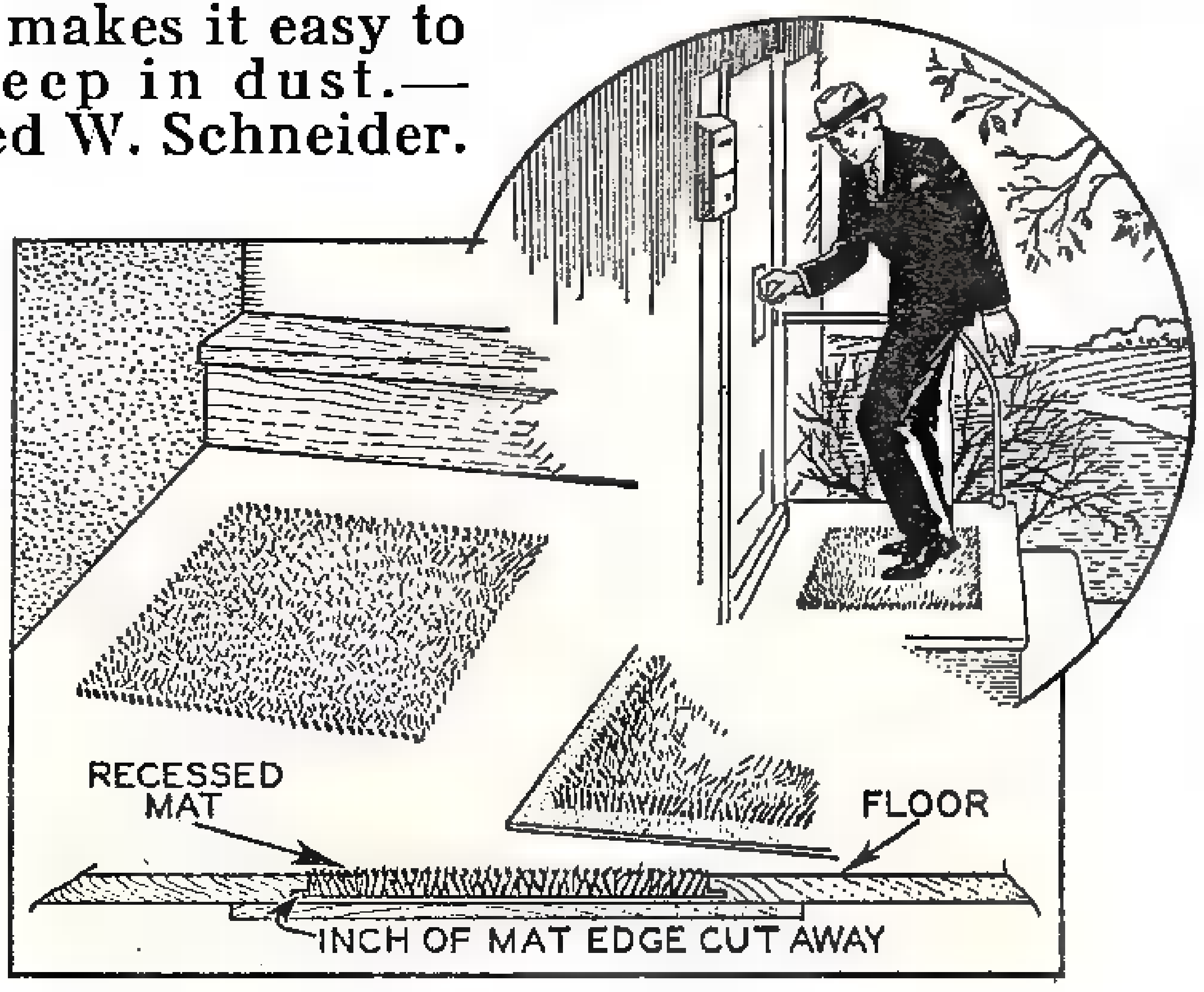


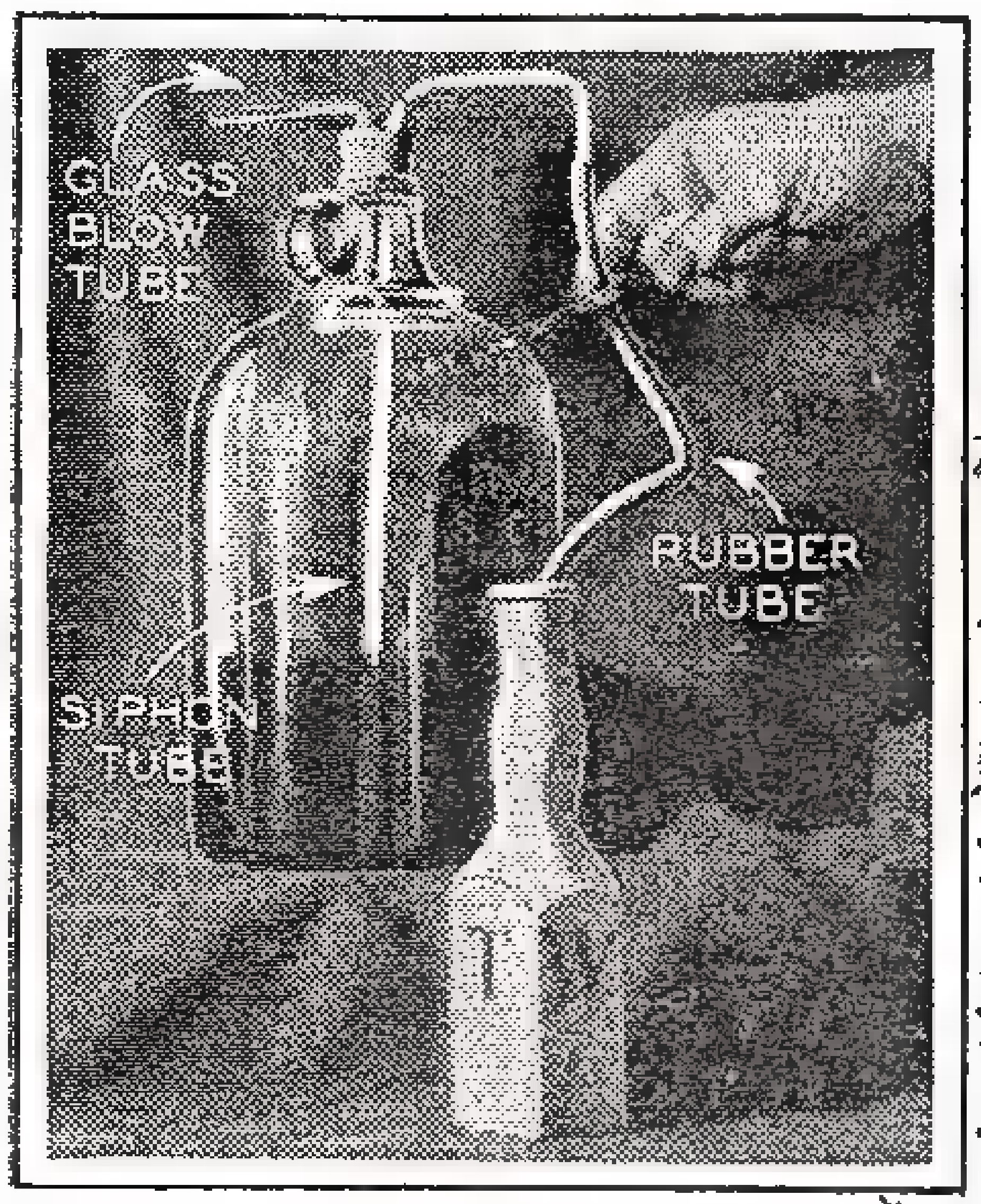
Handy Dust Container From Oil Can

FROM an old five-gallon oil can a very handy dust collector can be made. It can be moved around the house and will serve as a dust pan too, so that article can be dispensed with. Take a can, cut out as shown, leaving about four inches top and bottom. Bend a dust pan out of heavier material such as 22-gauge sheet, and rivet it in place. String can be used to trip it back in place. A scoop lip makes it easy to sweep in dust.—Fred W. Schneider.

Recessed Door Mat

A DOOR mat that is placed in front of a door in the ordinary loose manner is always a nuisance. It never gets used—and is in the way. I found that by cutting a recess in the floor of the porch and building a sunken platform, the mat performed its function. An inch fringe of bristle was clipped all around the edge, and this little "land" served the purpose of locking the mat in place. Neater, cleaner, and really useful.—Dale R. Van Horn.





Siphon Bottle for Home Tonics

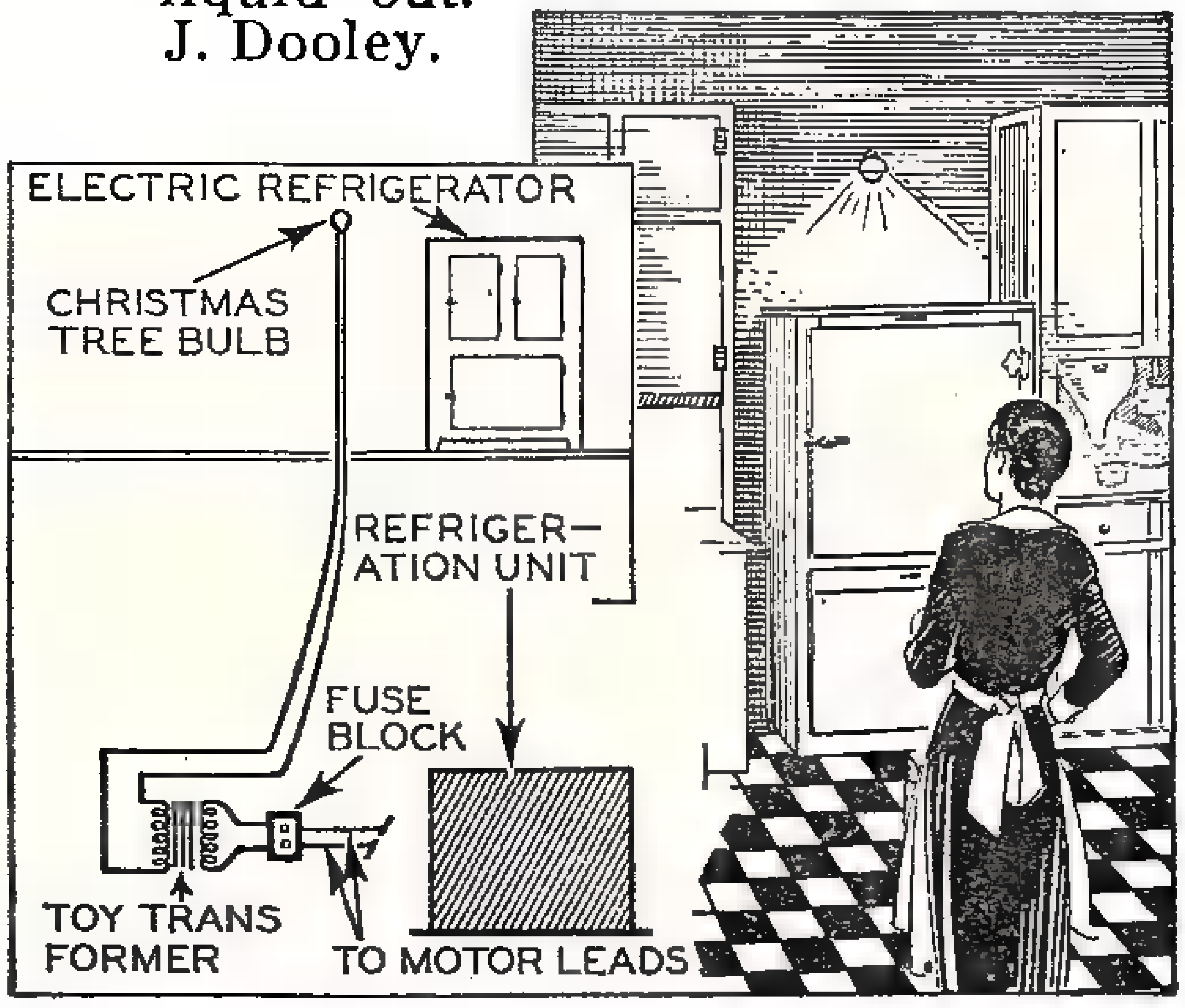
MANY thrifty people these days are taking advantage of buying conditions and are laying in supplies, both bottled and canned, in wholesale lots.

Such things as fruit juices and tonics or liquid soaps are rather awkward to pour into smaller bottles. This siphon idea is a world beater for handling the problem.

A small angle of glass tubing is held near a gas flame until it bends. It is inserted into one of two holes punched through a cork. Another elbow of glass, long enough to reach the liquid, is placed in the other hole. Blowing on shorter tube forces liquid out.
J. Dooley.

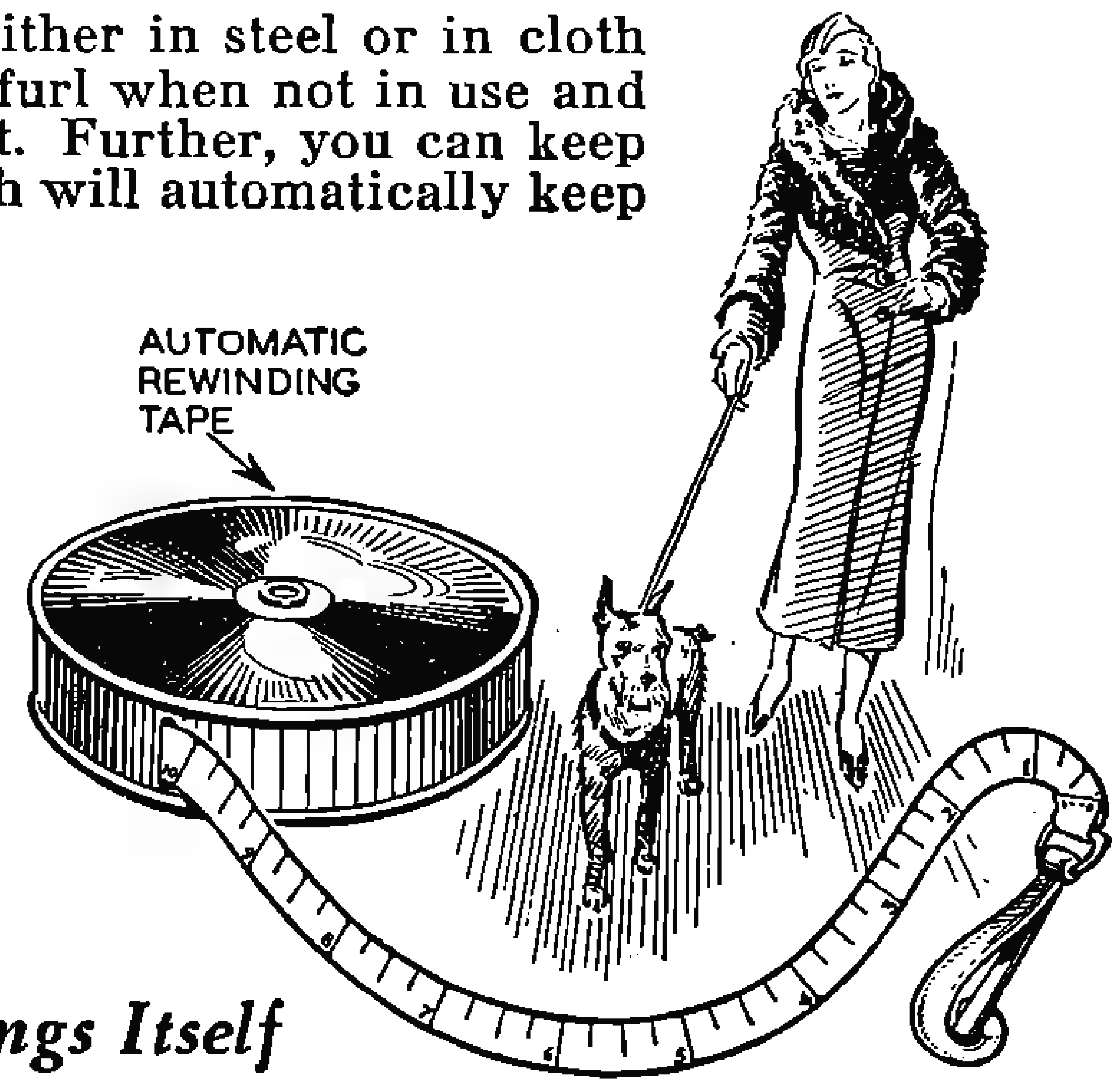
Indicator Light for Electric Icebox

TO THOSE people who have a refrigerating unit in the cellar and the icebox in the kitchen in order to lessen noise and vibration, a flashlight bulb indicator to tell whether or not the motor is running is very useful. It prevents putting food in the icebox during defrosting, etc. The indicator is made by connecting a toy transformer through a fuse block to the motor leads. Then wires are run from the 1.5 volt terminals to a socket containing a flashlight bulb mounted near the refrigerator. When motor is running, the lamp, which is an ordinary Christmas tree bulb, lights up. Installation of such a unit is recommended for use with the electric refrigerator plans published in the January issue of MODERN MECHANIX AND INVENTIONS, in which motor was under floor.—C. F. Hall.

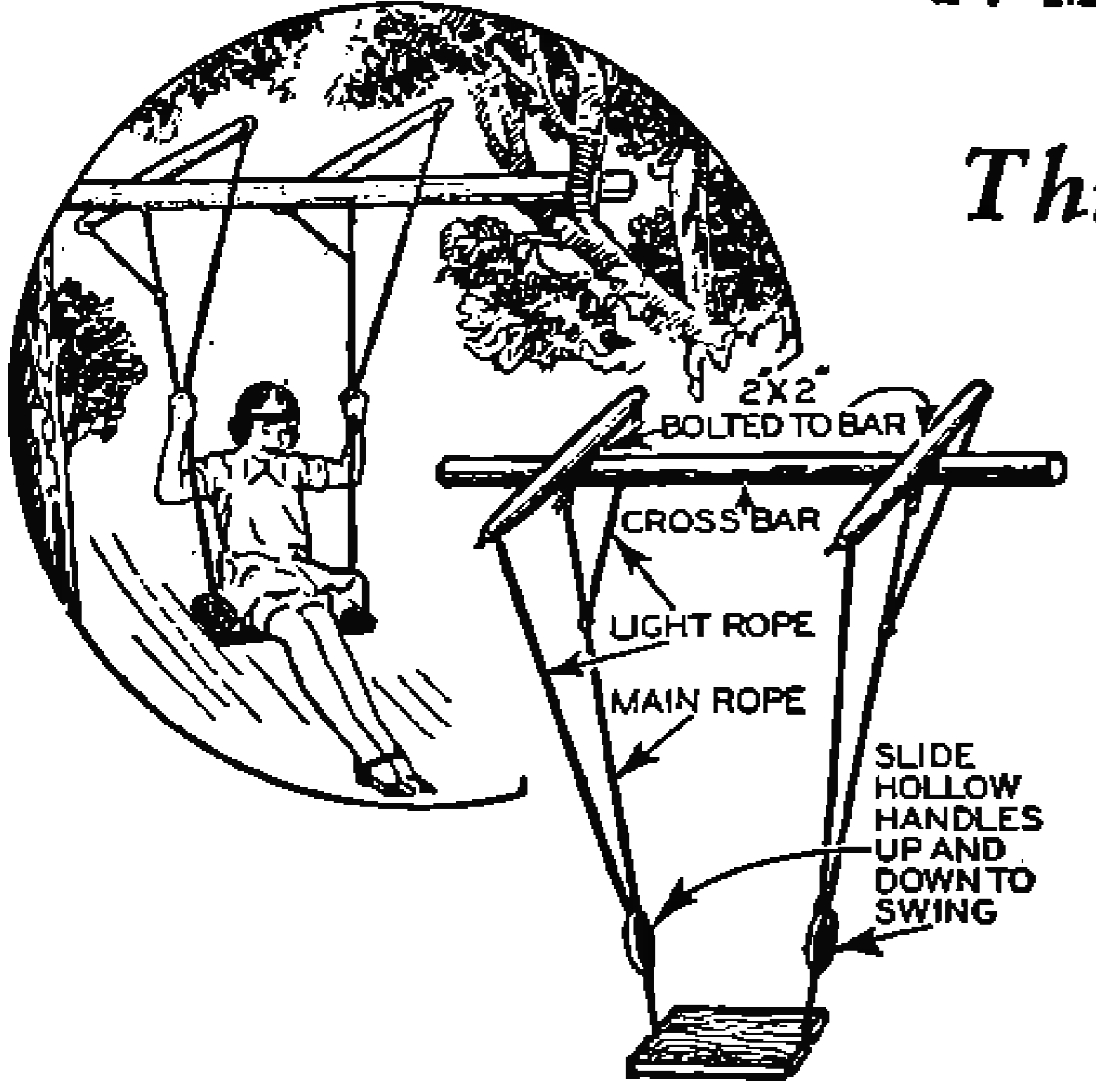


Playtime Wrinkles for Outdoors

AN AUTOMATIC rewinding tape measure either in steel or in cloth makes an ideal leash for the pup. It will furl when not in use and is thus made unobtrusive and highly compact. Further, you can keep your finger on the rewind button and the leash will automatically keep taut, so that the hound cannot get his legs caught in the leash. A snap is attached with a rivet to the end of the tape. The dog may run to the end of the tape without a great deal of strain on himself, and when he returns the tape automatically winds itself in, preventing loops and tangling or dragging of coils on the ordinary leash. The light steel tape measure makes the best tape to use for this stunt as it will not break and the dog cannot chew it. A good make with a durable spring should be chosen to stand up under the harsh usage to which the dog may put it.
—F. M. Benson.


AUTOMATIC
REWINDING
TAPE

This Swing Swings Itself


2"x2" BOLTED TO BAR
CROSS BAR
LIGHT ROPE
MAIN ROPE
SLIDE HOLLOW HANDLES UP AND DOWN TO SWING

AN AUTOMATIC swing that pumps itself can be made as shown in the little sketch to the left. Two cross bars of 2" x 2" material are harnessed with an A joint part way down the main swing ropes. Then from the ends of the cross pieces small light ropes are run down to corks or bobbins (hollowed out) placed on the other rope within easy reach of the swinger's hands. The method of operation is as follows: The swinger seats himself upon the swing in the usual manner, but instead of placing his hands upon the swing rope, he puts them on the bobbins. The increased leverage of the cross beams will hoist him to unusual heights.—Clarence Paulson.

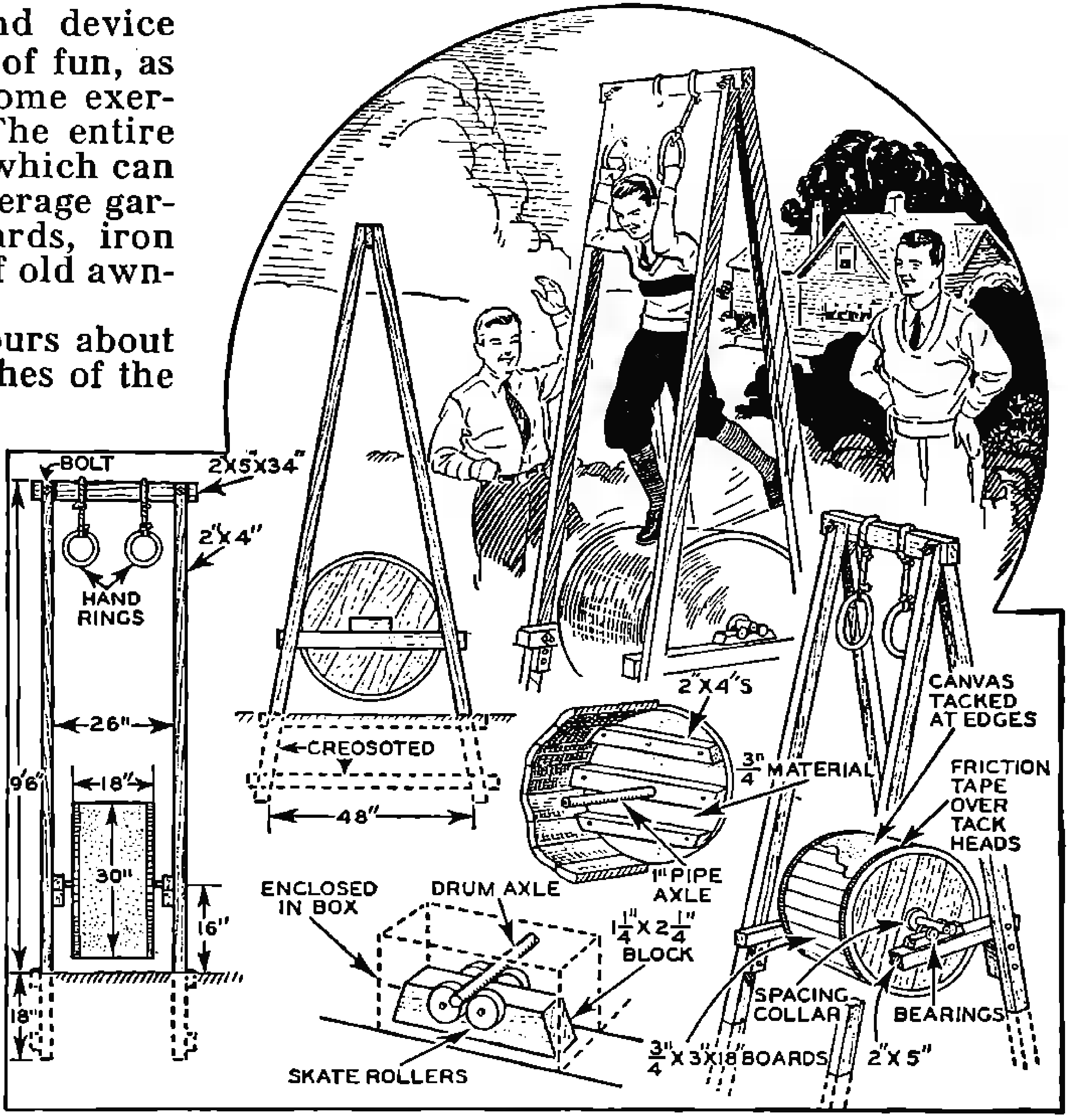
Here's Something New, the "Pedarol"; It Develops Nimble Young Feet

HERE is a home playground device that is a provider for lots of fun, as well as a furnisher of wholesome exercise. It is easily built, too. The entire structure is made of material which can be picked up in back of the average garage. Two by fours, odd boards, iron pipe, skate rollers and strips of old awning cloth are all that is needed.

For the frame use two by fours about eleven feet long. Eighteen inches of the lower ends are creosoted so that rot is prevented and so that the cross braces are covered with earth to the normal ground level.

The drum ends are built of ordinary ¾" material. Nail the boards together with temporary cleats and describe a 30-inch circle. Then saw them on a band saw.

Tread boards should next be nailed on. Use ¾" by 3" stuff if handy. Cover the tack heads with friction tape so there will be no danger of their catching in the clothing of children. By marking drum, speeds can be compared and races run.


BOLT
2"X5"X34"
2"X4"
HAND RINGS
26"
18"
30"
9'6"
16"
18"
CREOSOTED
48"
2"X4"S
3/4" MATERIAL
1" PIPE AXLE
CANVAS TACKED AT EDGES
FRICTION TAPE OVER TACK HEADS
ENCLOSED IN BOX
DRUM AXLE
1 1/4"X2 1/4" BLOCK
SKATE ROLLERS
SPACING COLLAR
BEARINGS
3/4"X3"X18" BOARDS
2"X5"

FIX-UP STUNTS

cure for sticking windows

To cure sticking windows, melt some ordinary paraffin and apply to the window frames when liquid with a small brush. Do this during dry weather. The next time [illegible] damp spell comes along, the wood will be unable to swell and stick, since the paraffin prevents moisture entering the fibers, and also acts [illegible] lubricant.

non-slip rug

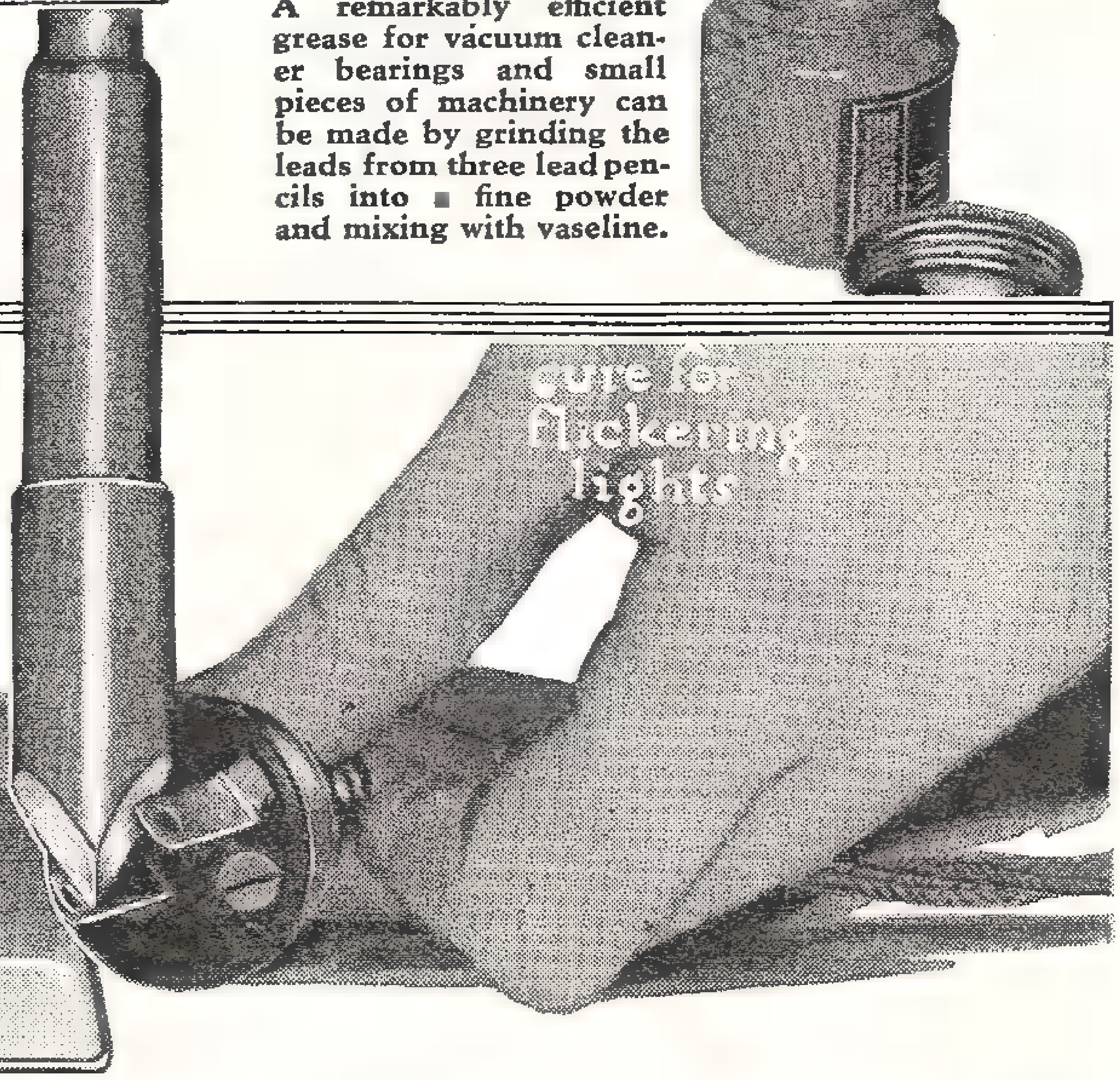
Disks about two inches in diameter, cut from coarse sandpaper and glued to the underside of throw rugs, prevent their skidding on slippery floors. Six disks should be used [illegible] rug.

bearing grease

A remarkably efficient grease for vacuum cleaner bearings and small pieces of machinery can be made by grinding the leads from three lead pencils into [illegible] fine powder and mixing with vaseline.

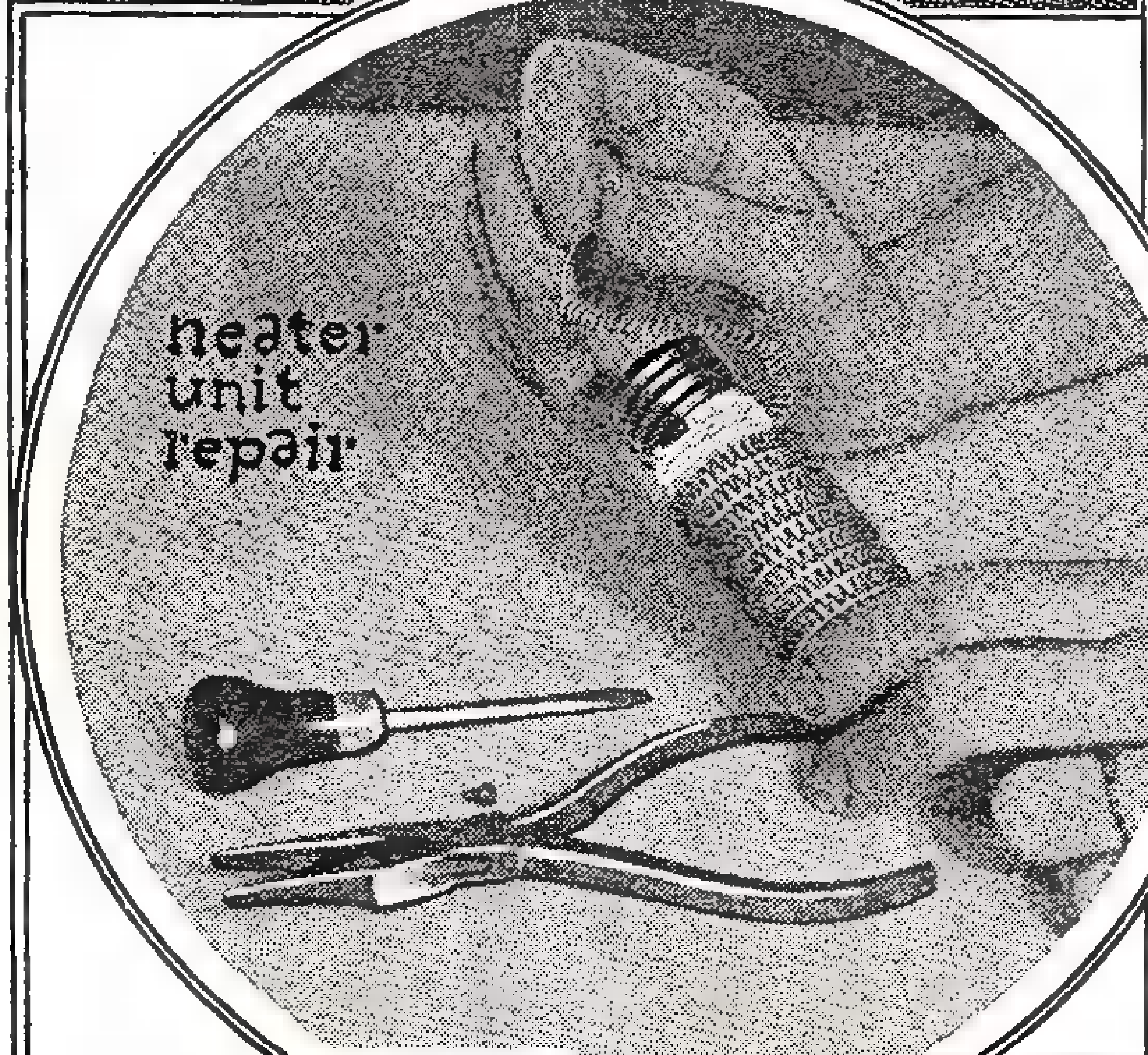
prevent iron overheating

Electric irons without automatic heat regulators can be controlled very simply. Place the iron [illegible] the bottom of a pan, as shown above. Surplus heat radiates away from the pan's surface. By using just the right sized pan (determined by experiment) the heat control is practically automatic.

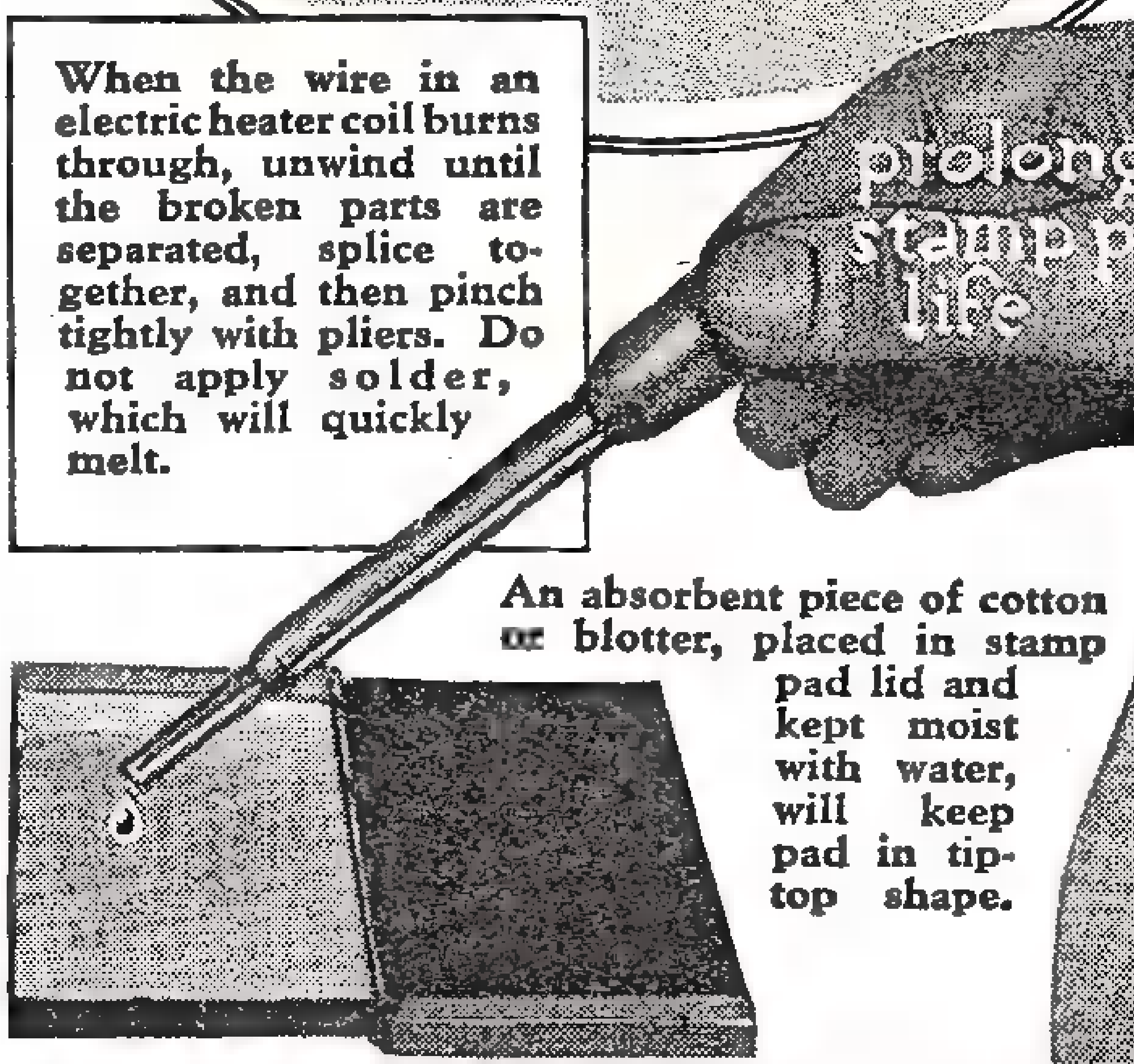


Plugs used in baseboard connections become spread a trifle with use, making poor connections with the circuit and causing flickering lights. A permanent cure can be effected by placing [illegible] bit of solder [illegible] the lugs to increase their thickness to a point where they will form [illegible] nice tight fit. A temporary remedy is to spring the lugs together with the fingers.

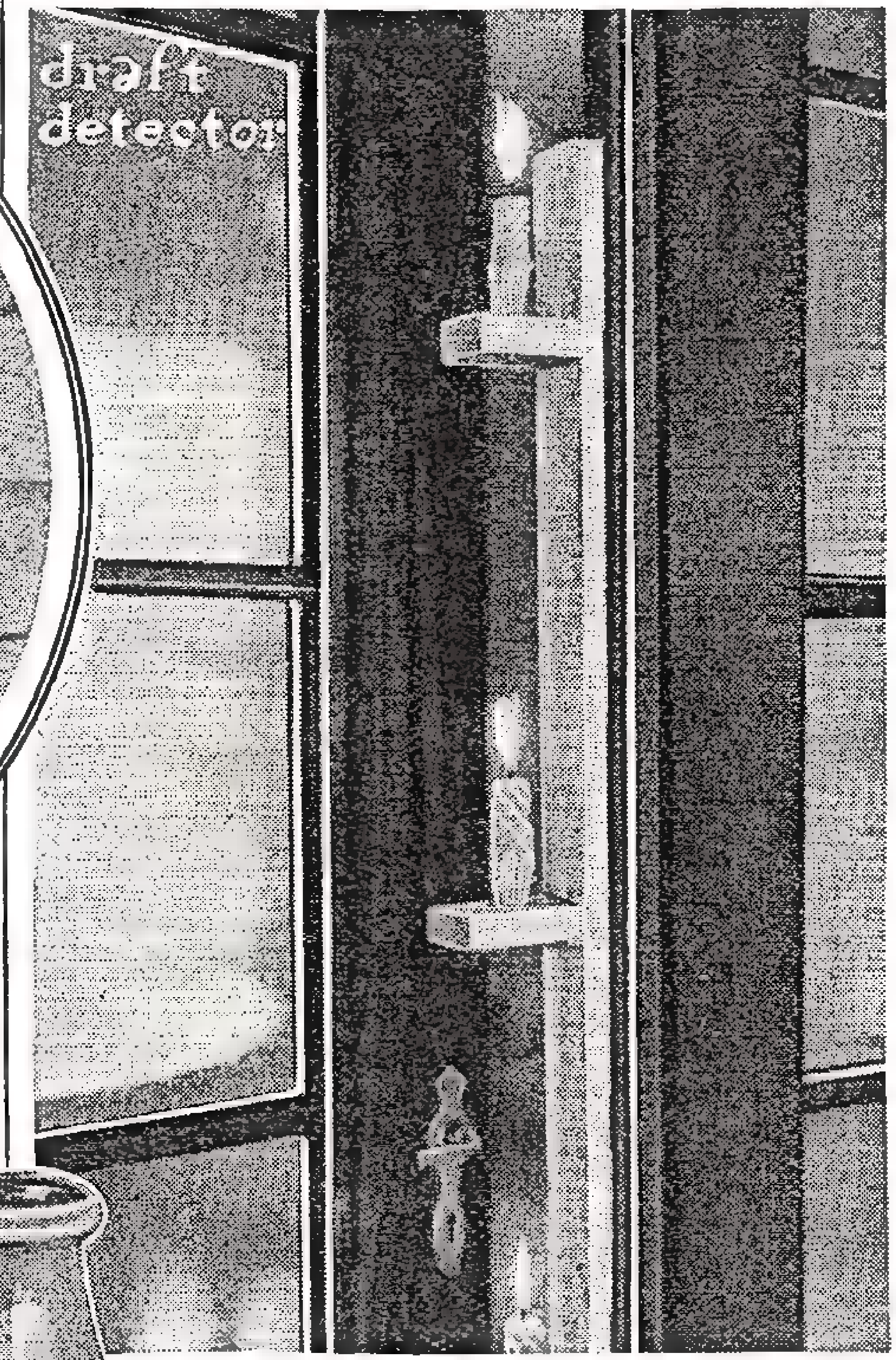
FOR THE HOME



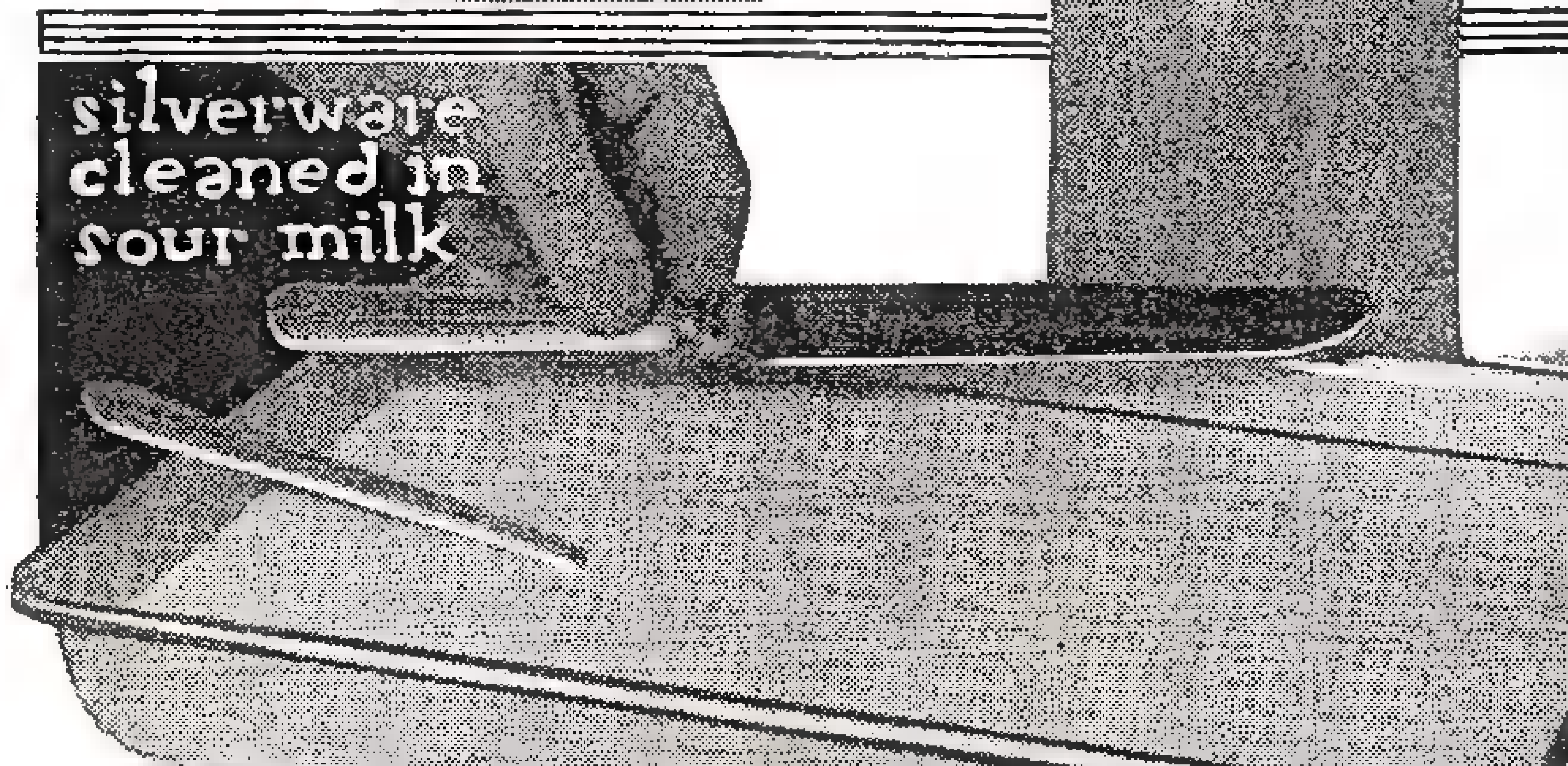
When the wire in an electric heater coil burns through, unwind until the broken parts are separated, splice together, and then pinch tightly with pliers. Do not apply solder, which will quickly melt.



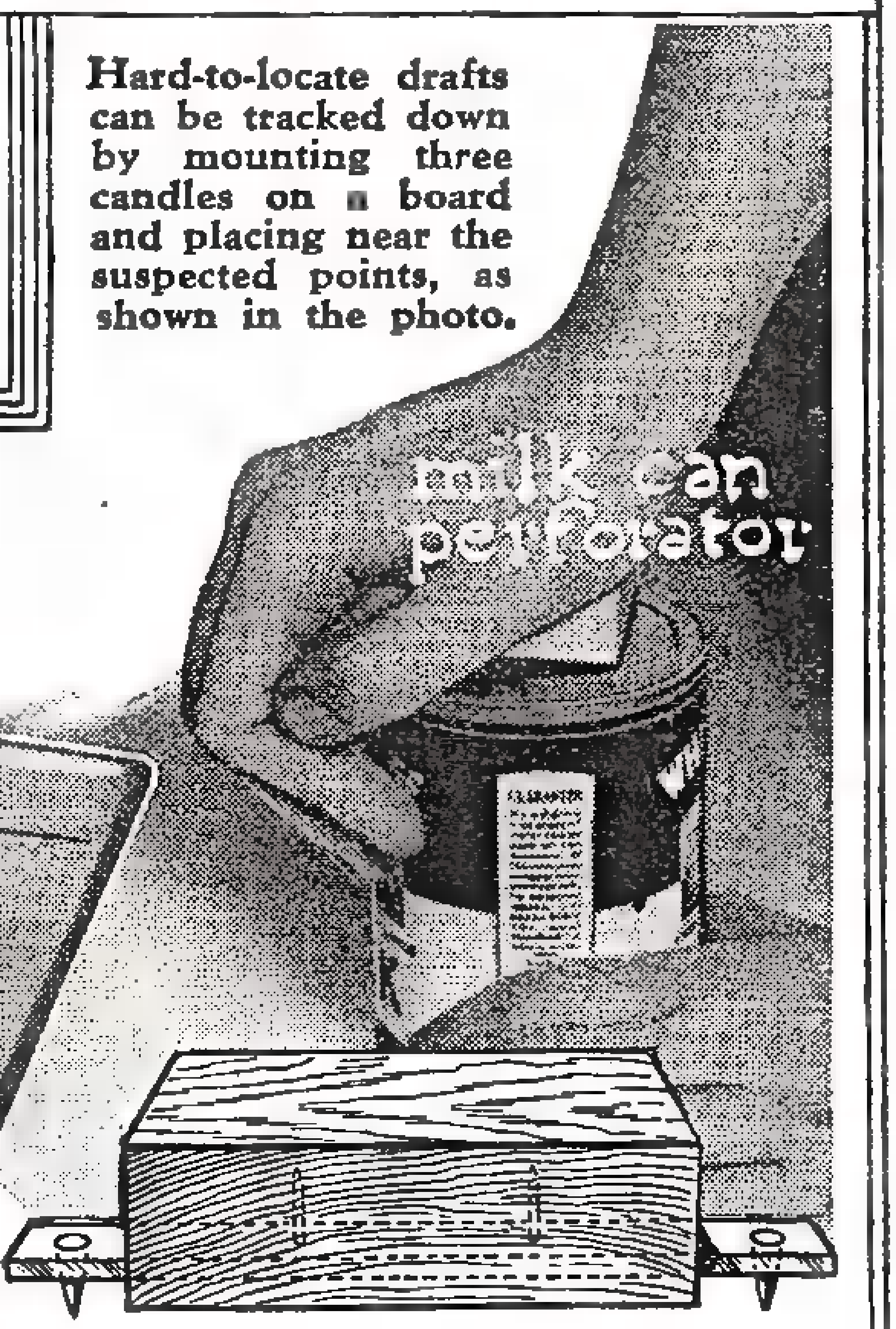
An absorbent piece of cotton or blotter, placed in stamp pad lid and kept moist with water, will keep pad in tip-top shape.



Hard-to-locate drafts can be tracked down by mounting three candles on a board and placing near the suspected points, as shown in the photo.

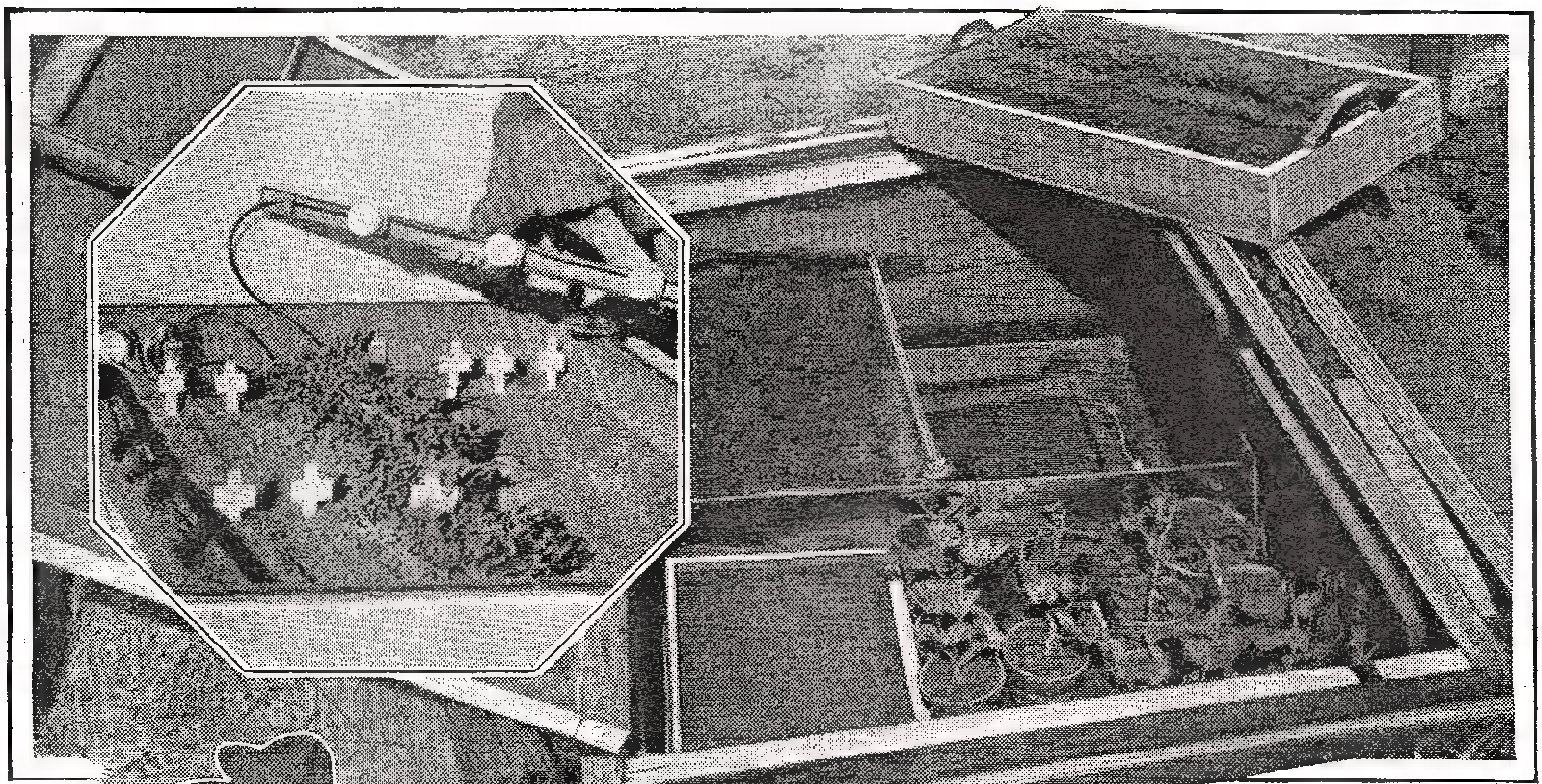


A purely chemical method of cleaning silverware, which removes none of the silver as is the case with polishes, is to immerse the silverware in a container of sour milk for 30 minutes to an hour. Lactic acid in the milk removes the stains when the silver is taken out and washed in warm water. Origin of the remedy is attributed to Paul Revere.

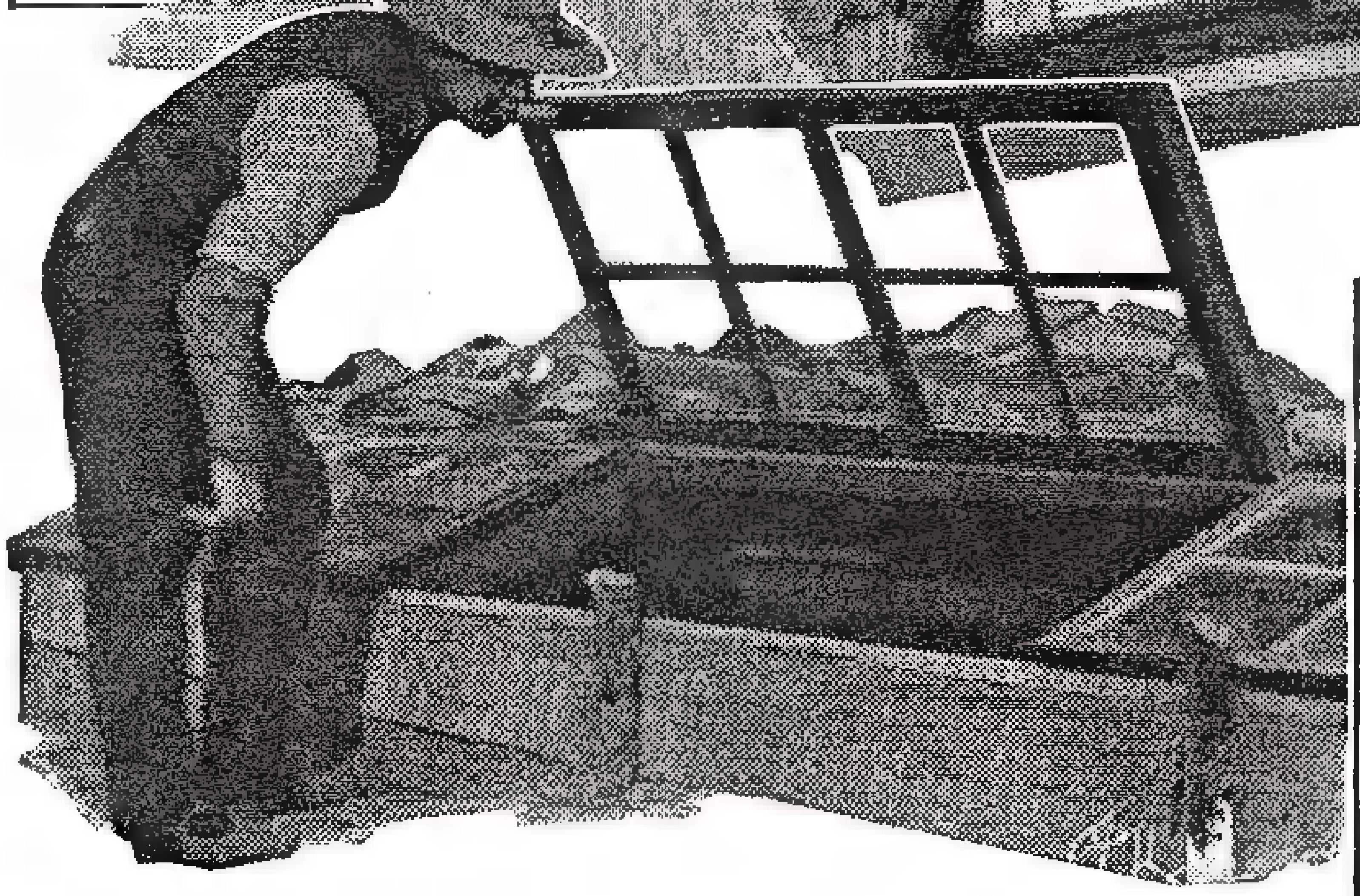


Condensed milk pours evenly out of a can only when two holes are punched—one for the flow, the other to admit air. A handy punch as shown above, made from scraps found in your workshop, speeds up the process and prevents painful and dangerous injury from slipping can openers.

Electric HOTBED Speeds Plant Growth



Another type of hotbed, sunk below ground, is shown above. Insert at left shows open loop of bare alloy used to transmit current instead of lamp bulbs.

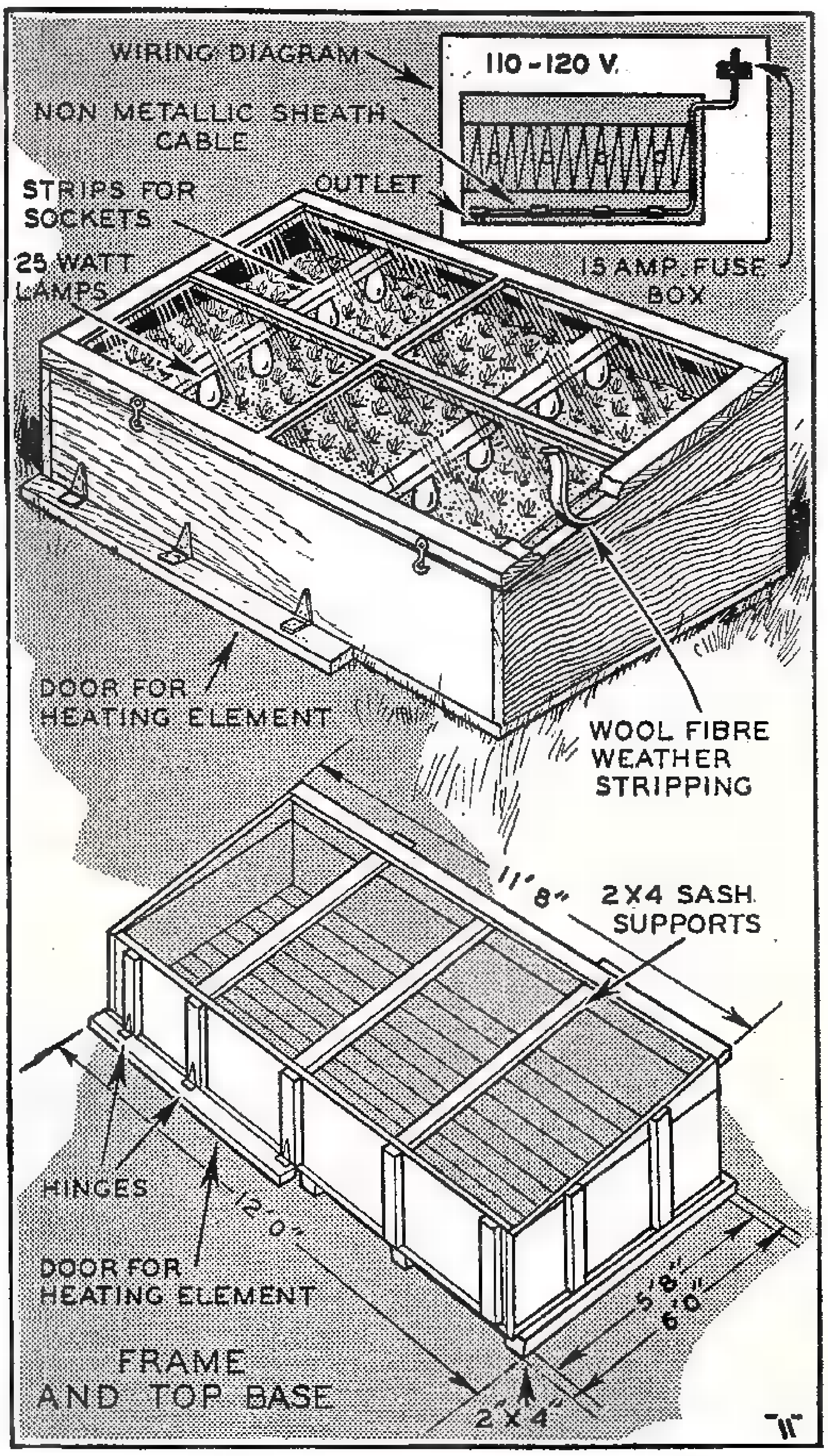


The gardener above is lifting the top of a four-section hotbed, heated electrically with lamp bulbs. Construction is simple, following principles described below, which can be altered to individual preference as regards dimensions.

BACKYARD gardeners who use an electrically heated hotbed can speed up plant growth amazingly. Lettuce breaks the soil in three days, geraniums root in half the time, and cabbages are ready for transplanting nine days from seeding.

A small hotbed using eight 25-watt electric lamps can be built in half a day for less than $5. A 4x6 foot hotbed, built on the south side of a building, provides ample space for 100 seeds of 50 different varieties. Box construction is simple, the top being a frame to hold glass panes, with two cross strips, each of which carries four 25-watt bulbs spaced evenly apart, connected to an electric outlet from the building. A thermostat, obtainable at any electric supply house, automatically turns on the circuit when temperatures within the box fall below 50 degrees.

Two layers of translucent screen are advised for the top of the box. Air space between the two serves to conserve heat. Wool fiber strips afford a weather-tight seal between the box and the top of the frame.


WIRING DIAGRAM
110-120 V.
NON METALLIC SHEATH CABLE
OUTLET
STRIPS FOR SOCKETS
25 WATT LAMPS
15 AMP. FUSE BOX
DOOR FOR HEATING ELEMENT
WOOL FIBRE WEATHER STRIPPING
11'8"
2X4 SASH SUPPORTS
HINGES
12'0"
DOOR FOR HEATING ELEMENT
5'8"
6'0"
FRAME AND TOP BASE
2"x4"

Two suggested sizes of hotbeds are shown in drawing.

Testing HOUSEHOLD Materials

Butter
Wool
Pickles
Silk
Tea
Cleaning powder

When a spoonful of butter is held over a flame as demonstrated above, it will boil quietly with many tiny bubbles. Impure butter, however, will boil with a great deal of spluttering, and without any of the tiny bubbles which rise in the pure butter. The smoother the boiling the better the grade of butter you have purchased.

When pure wool is held in a match flame, it will burn slowly in the manner of burning feathers, and a sticky, gummy residue will be left. If the material does not burn in this fashion it is not the real stuff, but substitute.

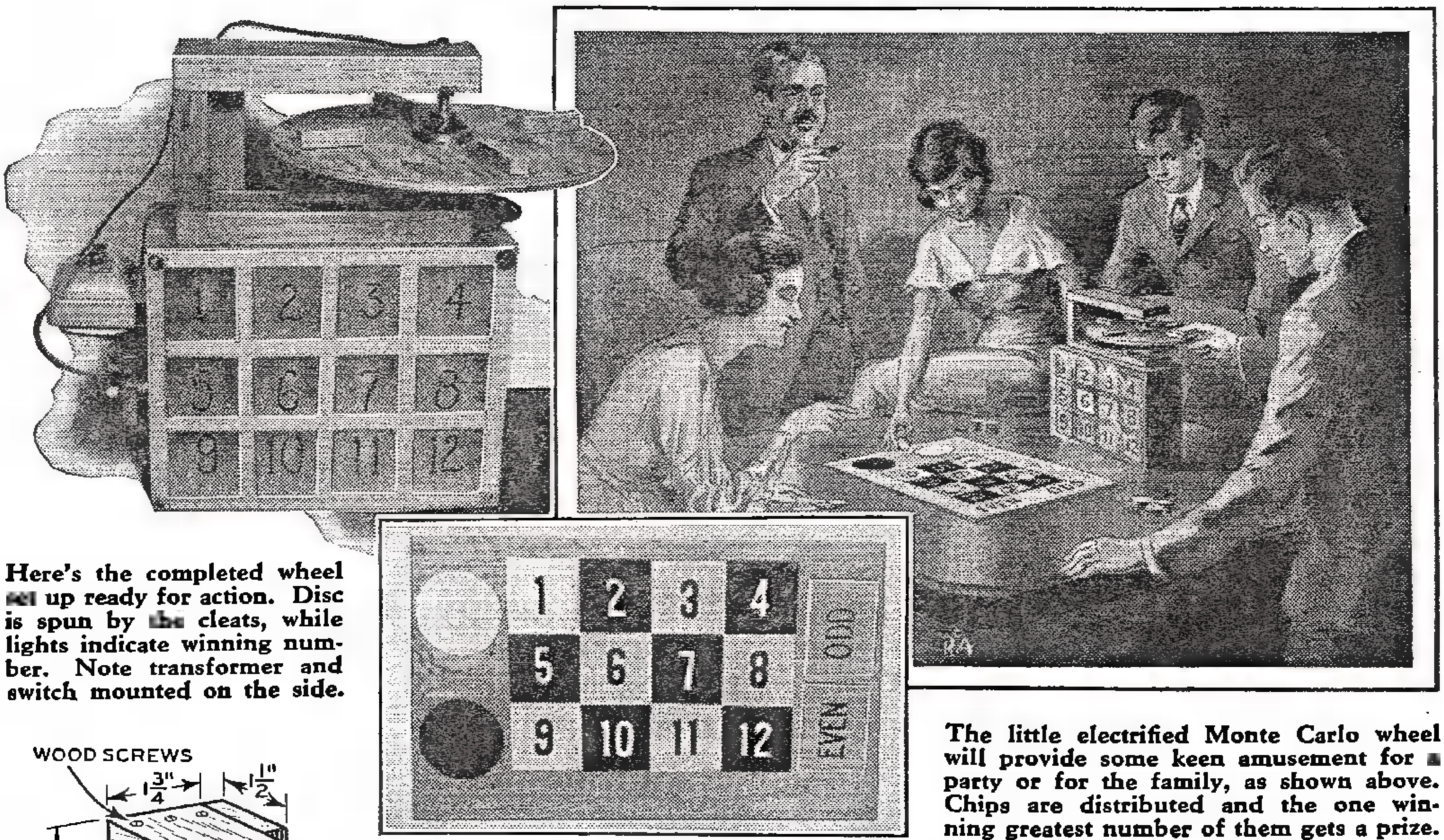
Slowly boil a piece of silk to be tested in a 5 per cent solution of caustic soda. Pure silk will dissolve; an impure product will not.

Pickles prepared by boiling in copper vessels have a beautiful green tint due to the presence of copper. When prepared in this dangerous manner they may be tested by leaving an iron nail in the liquid. If the nail becomes copper-coated, the pickles are not fit to eat, so beware of them.

Sometimes in low-priced teas dyes are used to impart a color above a natural tint. If some of the fresh tea is rubbed vigorously between the folds of a white piece of cloth, as illustrated above, some of the dye will be rubbed off. High grade tea shows no such stains.

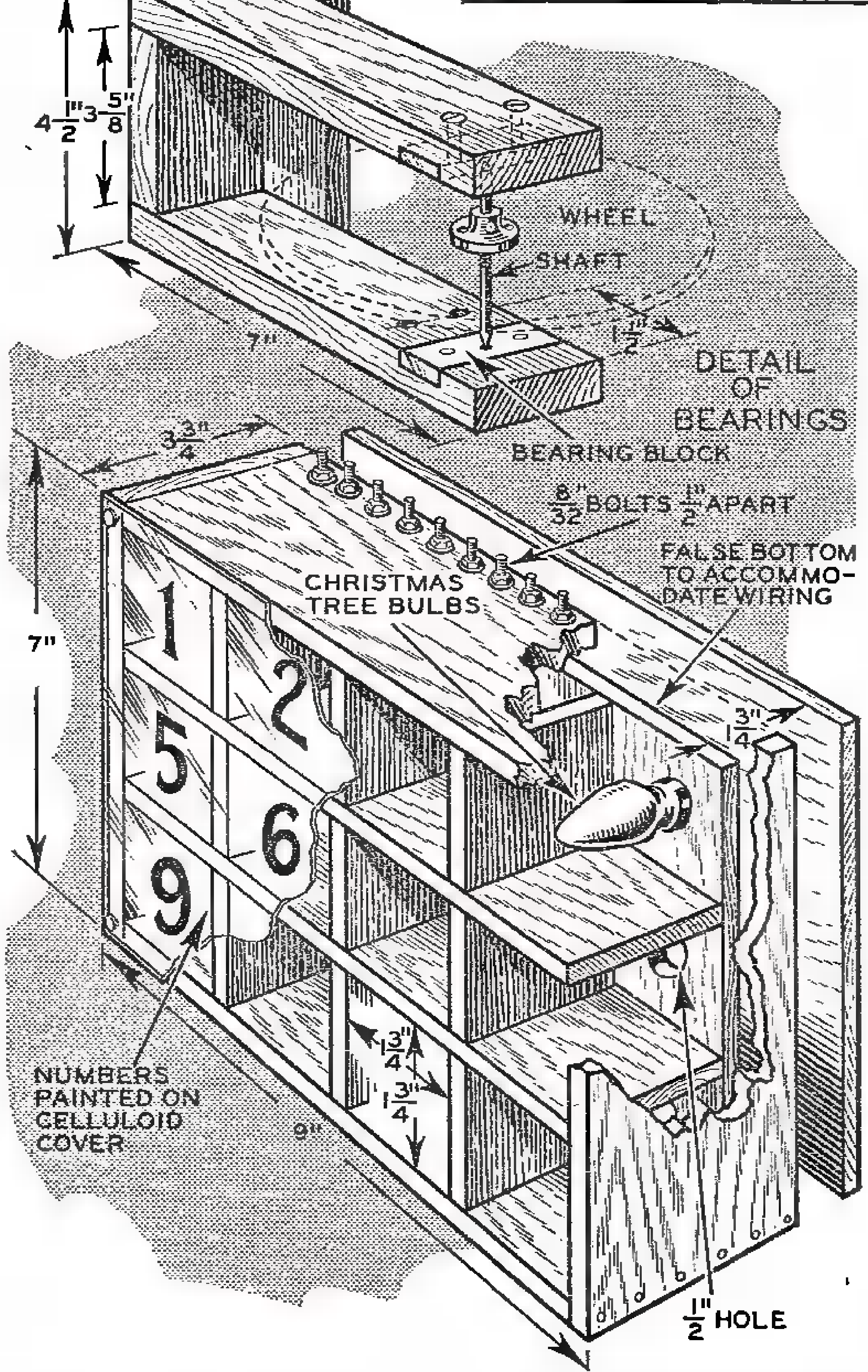
Presence of marble dust, which is a harmful abrasive, in cleaning powder may be detected by dropping a few drops of storage battery electrolyte on the powder. If a gas is liberated upon contact of the liquid with the powder, marble dust is present.

Have PARTY FUN With



Here's the completed wheel set up ready for action. Disc is spun by the cleats, while lights indicate winning number. Note transformer and switch mounted on the side.

The little electrified Monte Carlo wheel will provide some keen amusement for a party or for the family, as shown above. Chips are distributed and the one winning greatest number of them gets a prize.



Details of box assembly are seen above. The arms which hold bearings for the spinning wheel are mounted on the top of box. Bearings should fit perfectly for long turns. At extreme top is layout of the playing board. Players can lay money on odd or even, on single numbers, or on 2 or 4 numbers. Croupier pays 12 to 1 on single number plays.

THIS is a miniature and electric version of Monte Carlo which has proven to be the life of many parties. When spun around it comes to a stop and flashes the winning number or the winning color through the medium of twelve Christmas tree lamps operating from an 8-volt door bell transformer or a battery of dry cells.

Work is started on the box and this is made of half inch soft pine or plywood, which is assembled with nails. There is a false bottom of white pine which is provided with twelve half-inch holes into which the little light sockets fit very tightly. The sockets are forced into place before the bottom is finally nailed in place with brads.

It will be found that these Christmas tree sockets have five-inch pigtails which are sufficiently long to make the needed connections to the brass machine screw terminals arranged in the back (see accompanying drawing). Thirteen screws will be needed, one for each one of the lights and one for a common terminal. Each screw is provided with a soldering lug. In making the common terminal, the twelve pigtails are all twisted together and then soldered, a lead being then soldered to the group and carried to the thirteenth terminal.

The wheel is cut from plywood to prevent future warping and it is provided with a steel or brass hub to anchor the wheel and to assure smooth, "wobble-less" running. The shaft is a quarter-inch brass or steel rod, the ends tapering 45° to a point.

The bearings were made of two small pieces of brass and provided with tapered holes that would fit the points on the ends of the shaft. The builder will do well to

ELECTRIC Game of CHANCE

use a little care on these bearings, not only in drilling the holes but in lining them up as well. Good bearings prolong the spin and excitement.

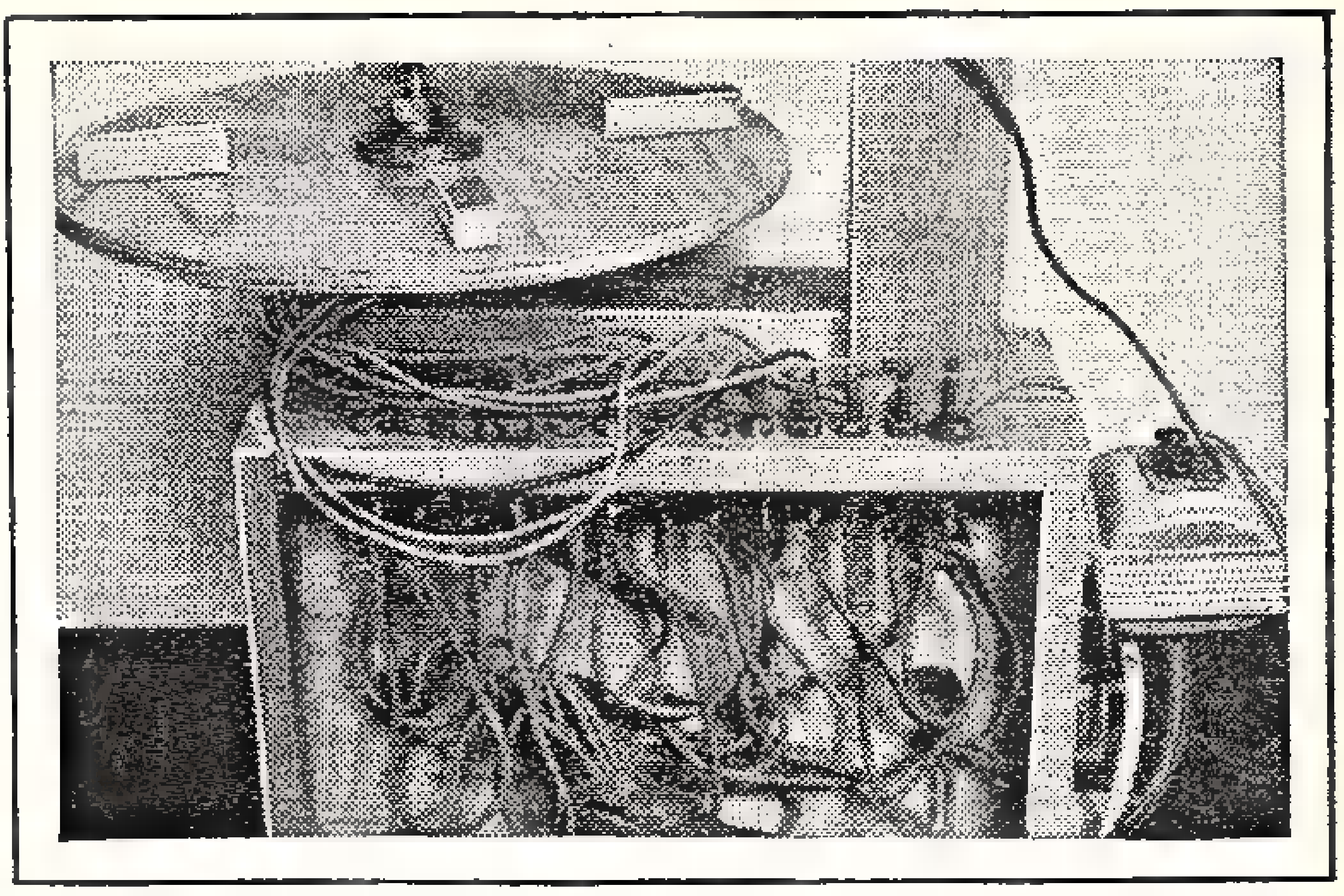
To facilitate spinning by the banker, the wheel is provided with four little cleats which may be glued on equidistant from the center to preserve the wheel's balance.

It will be noticed that under the head of one of the bearings holding the wheel a little phosphor bronze contactor strip is anchored at such an angle that its tip will play over the contacts point mounted under it. The mounting of the contact block, which is made of soft pine, is also important and it should be noted that this member does not bind the shaft.

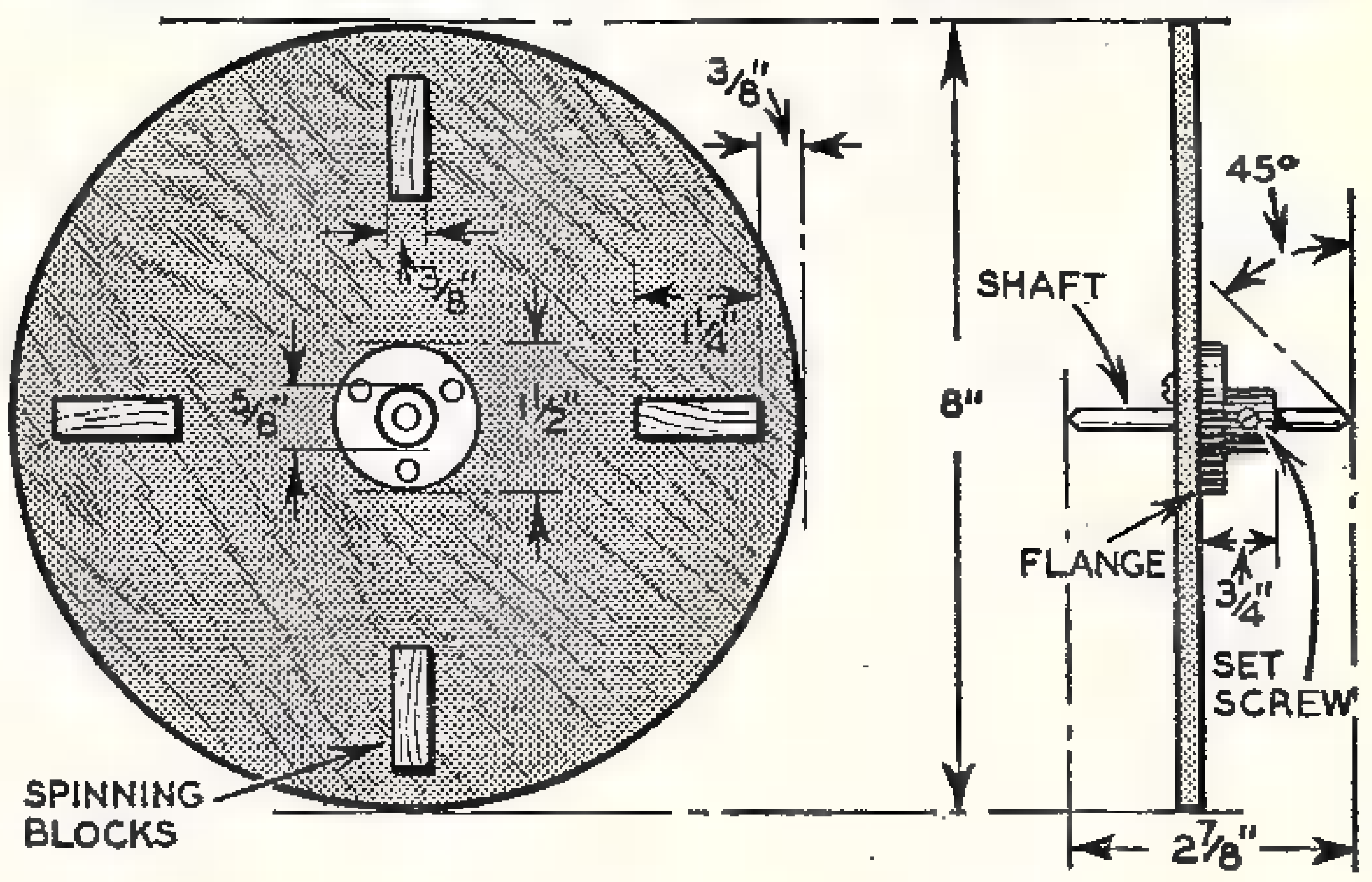
Now for the screen covering the lights. Six red lights and six greens are used and the numbers flash consecutively. Sheet celluloid was used and sand papered to diffuse the light. Take India ink for printing figures.

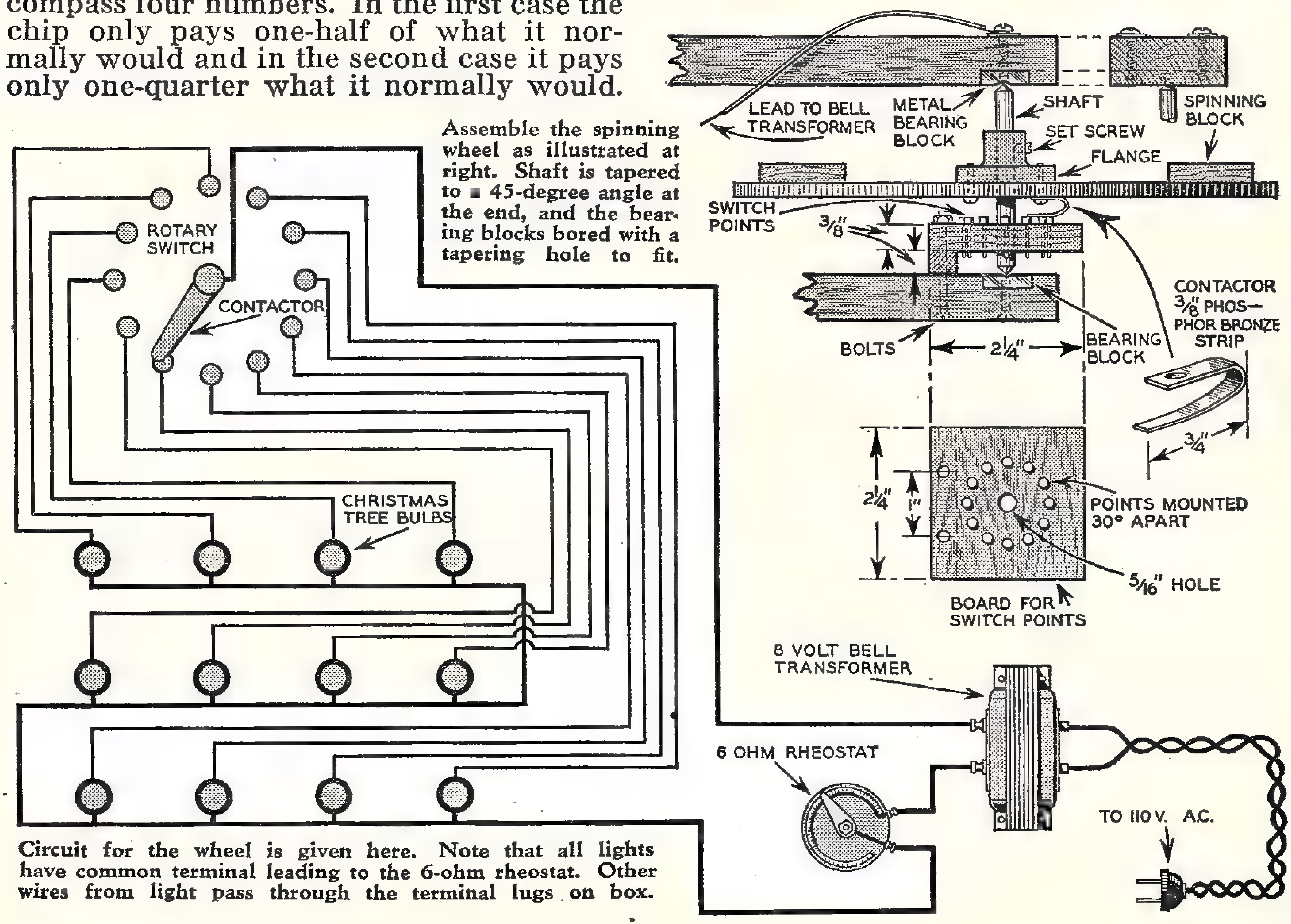
The board upon which all of the wagers are placed is cut from plywood and the squares painted to conform to the arrangement of the lights.

Now about the rules of the game. A player may bet odd or even, green or red, individual numbers, two numbers or four numbers. When two numbers are played the chip is laid half on one square and half on an adjacent square. If four numbers are to be played the chip is placed so as to encompass four numbers. In the first case the chip only pays one-half of what it normally would and in the second case it pays only one-quarter what it normally would.



Rear view of the box here shows how the lights are wired to the terminal bolts at the top. One wire from each light leads to a bolt, while remaining wires go to 13th bolt. Note cleats on the wheel. These are grasped preparatory to giving a vigorous spin—and the stronger the better.

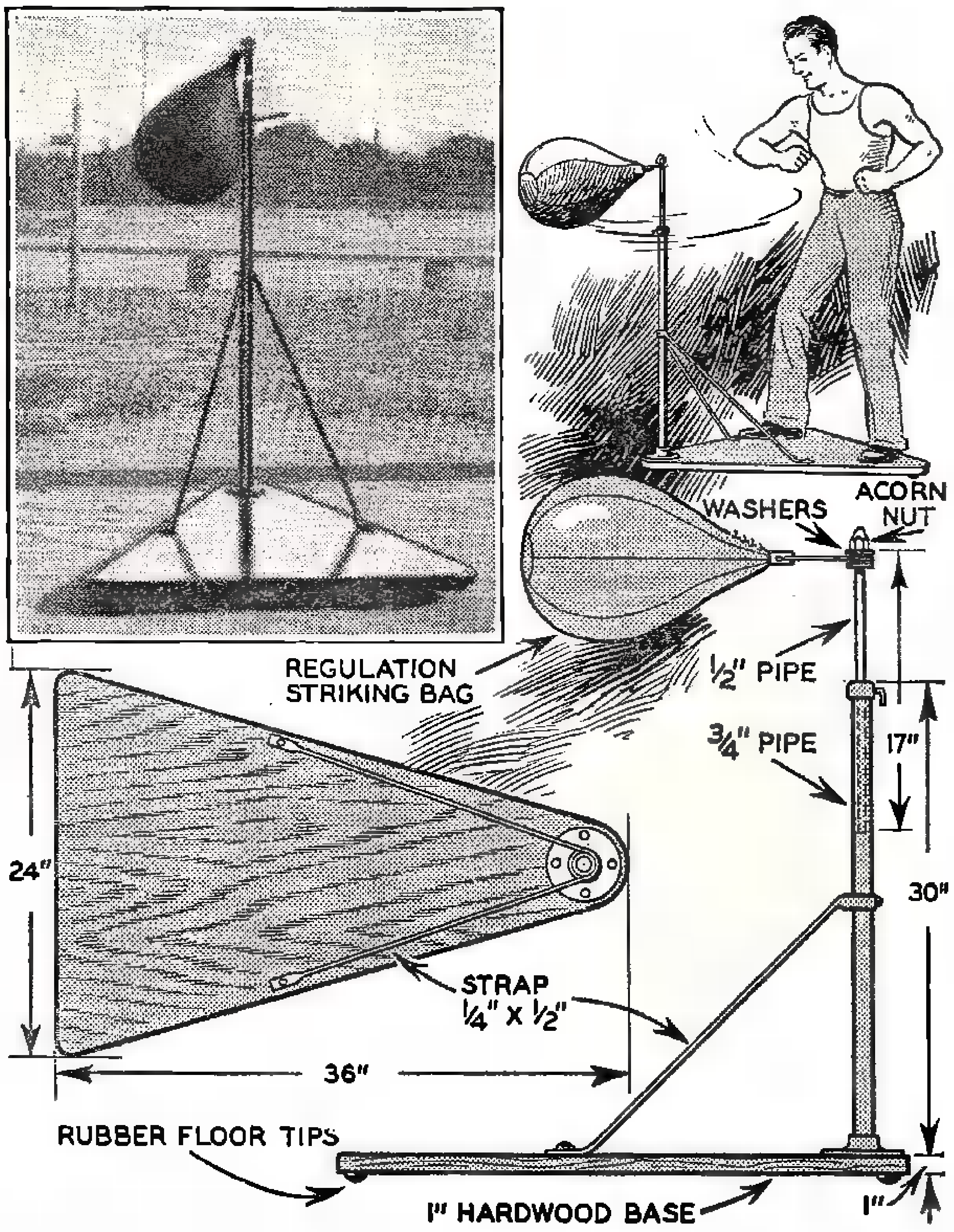

3/8"
3/8"
1/4"
5/8"
1/2"
8"
45°
SHAFT
FLANGE
3/4"
SET SCREW
SPINNING BLOCKS
2 7/8"


LEAD TO BELL TRANSFORMER
METAL BEARING BLOCK
SHAFT
SPINNING BLOCK
SET SCREW
FLANGE
SWITCH POINTS
3/8"
CONTACTOR 3/8" PHOSPHOR BRONZE STRIP
BOLTS
2 1/4"
BEARING BLOCK
3/4"
2 1/4"
1"
POINTS MOUNTED 30° APART
5/16" HOLE
BOARD FOR SWITCH POINTS
ROTARY SWITCH
CONTACTOR
CHRISTMAS TREE BULBS
8 VOLT BELL TRANSFORMER
6 OHM RHEOSTAT
TO 110 V. A.C.

Assemble the spinning wheel as illustrated at right. Shaft is tapered to a 45-degree angle at the end, and the bearing blocks bored with a tapering hole to fit.

Circuit for the wheel is given here. Note that all lights have common terminal leading to the 6-ohm rheostat. Other wires from light pass through the terminal lugs on box.

You Get Fun and Exercise From This "Whirlo" Punch Bag



Mount the pipe on the platform as illustrated here. The middle of the V-shaped strap brace bolts to the pipe, while its ends are bolted to platform about 18 in. from the flange. Note how bag is struck.

THIS muscle building exercising device has the advantage of being movable and, unlike the overhead type of striking bag, can be used without a permanent fastening.

A platform, triangular in shape, measuring 3 feet on the sides, and 2 feet across the front, is made first, preferably of hardwood. A ¾" pipe flange is then screwed at the pointed end and 3 rubber floor tips are placed at each corner of the triangle to prevent slipping.

Next a piece of ¾" pipe 30" in length is drilled for a ¼" bolt 15" from one end, while the other is fitted with a pipe cap which has a ¾" hole and carries a hand set screw on its side. Through this cap a 17" piece of ½" pipe is allowed to telescope, making it adjustable.

On the upper end of this same piece, a thread is first made to carry an acorn nut, and ½" below this a washer is brazed in place.

A regulation bag is now fitted with a piece of leather strap 4" long in which a ¾" hole has been made. This strap is fastened to the bag by separating the loop with which the bag is provided, placing the strap between the two pieces thus formed, and then fastening the 3 together with a copper rivet. The unit is now slipped over the top pipe, the acorn nut threaded on ready for battering.

Wooden Displacement Blocks in Film Tank Saves Developing Chemicals

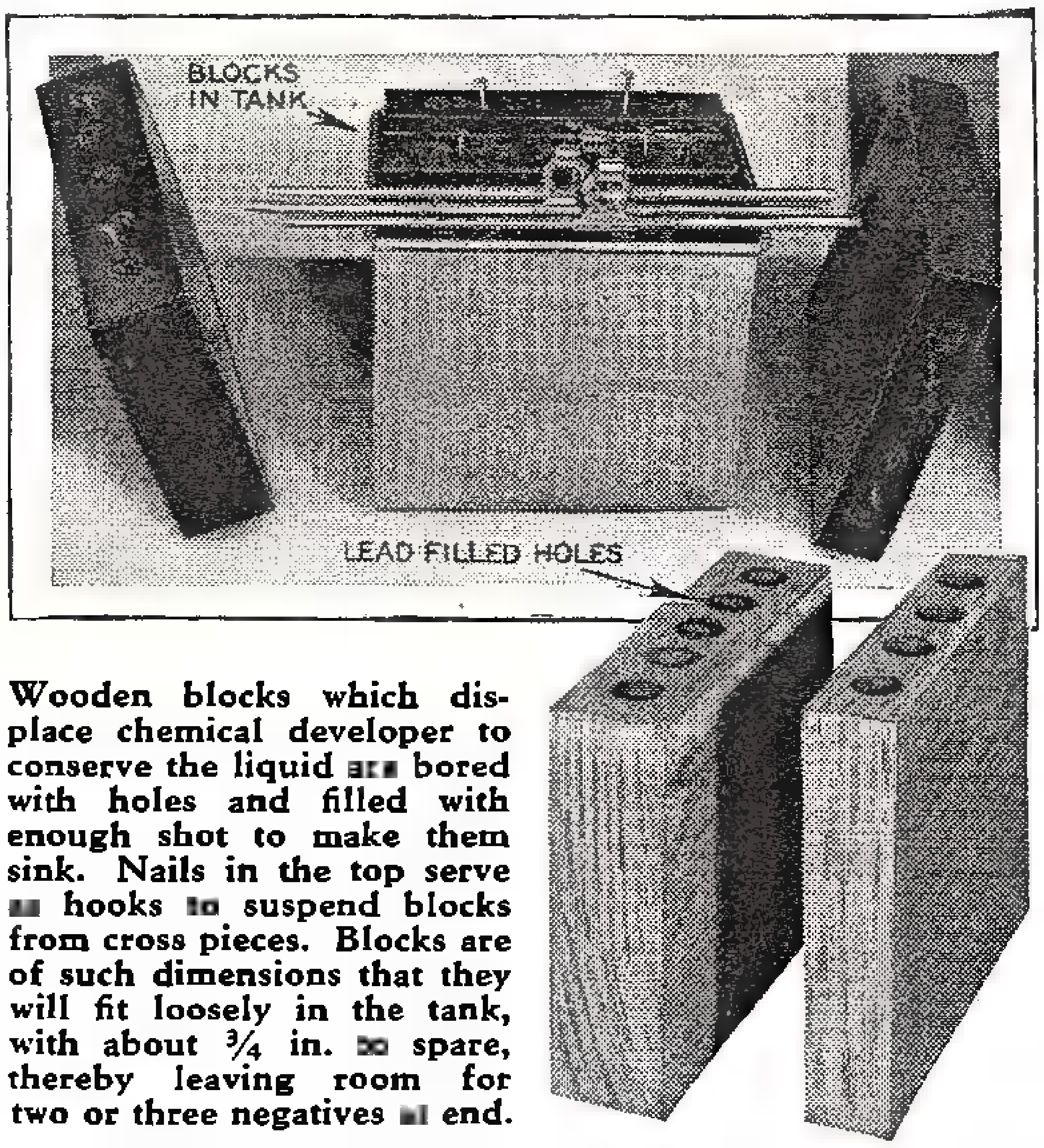
PHOTOGRAPHIC chemicals are so inexpensive that there seems little justification in preaching monetary economy in their use. There is, however, a logical economy in time and labor that can be practiced.

Many amateur cameramen, in developing small cut films, employ a tank which will accommodate a dozen films suspended from individual hangers as illustrated in the photo. This is very convenient when it is desired to develop a dozen films at a time, but more often than not only three or four films are on the schedule. Then is when it seems needless to use developer for a full dozen.

The photo at the right shows four wooden blocks cut to such dimensions that they fit loosely into the tank with about ¾ in. to spare, thereby leaving enough room for two negatives suspended from hangers.

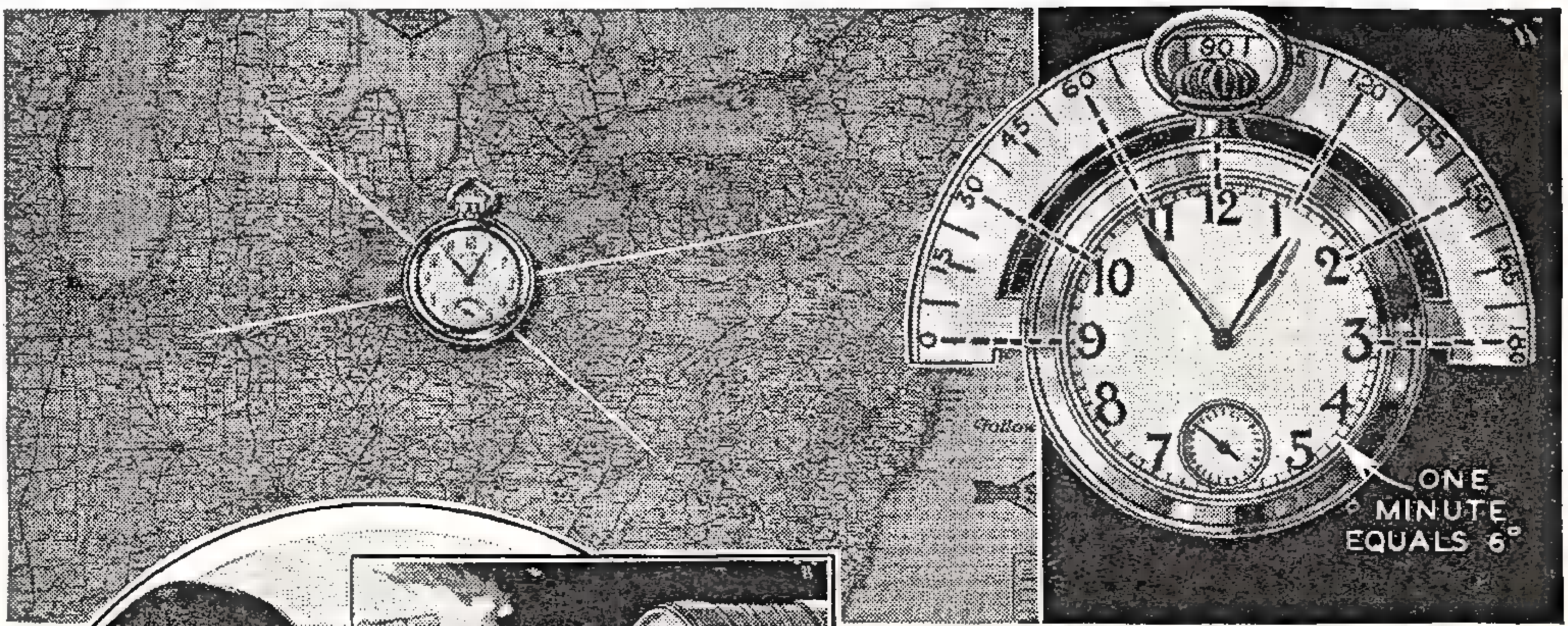
These blocks have several holes each drilled in them to such a depth that when the holes are filled with lead shot the blocks will not float. Hot paraffin is then poured over the shot, and when cooled the wax is smoothed down even with the wood surface. Nails may be driven into the top surface of the blocks to serve as lifting handles, and then two or three coats of chemical resisting paint is applied over all.

The blocks may be used with varying number of negatives. For each additional group of three films to be developed, remove one block, and you'll save a lot in chemicals, time and labor.

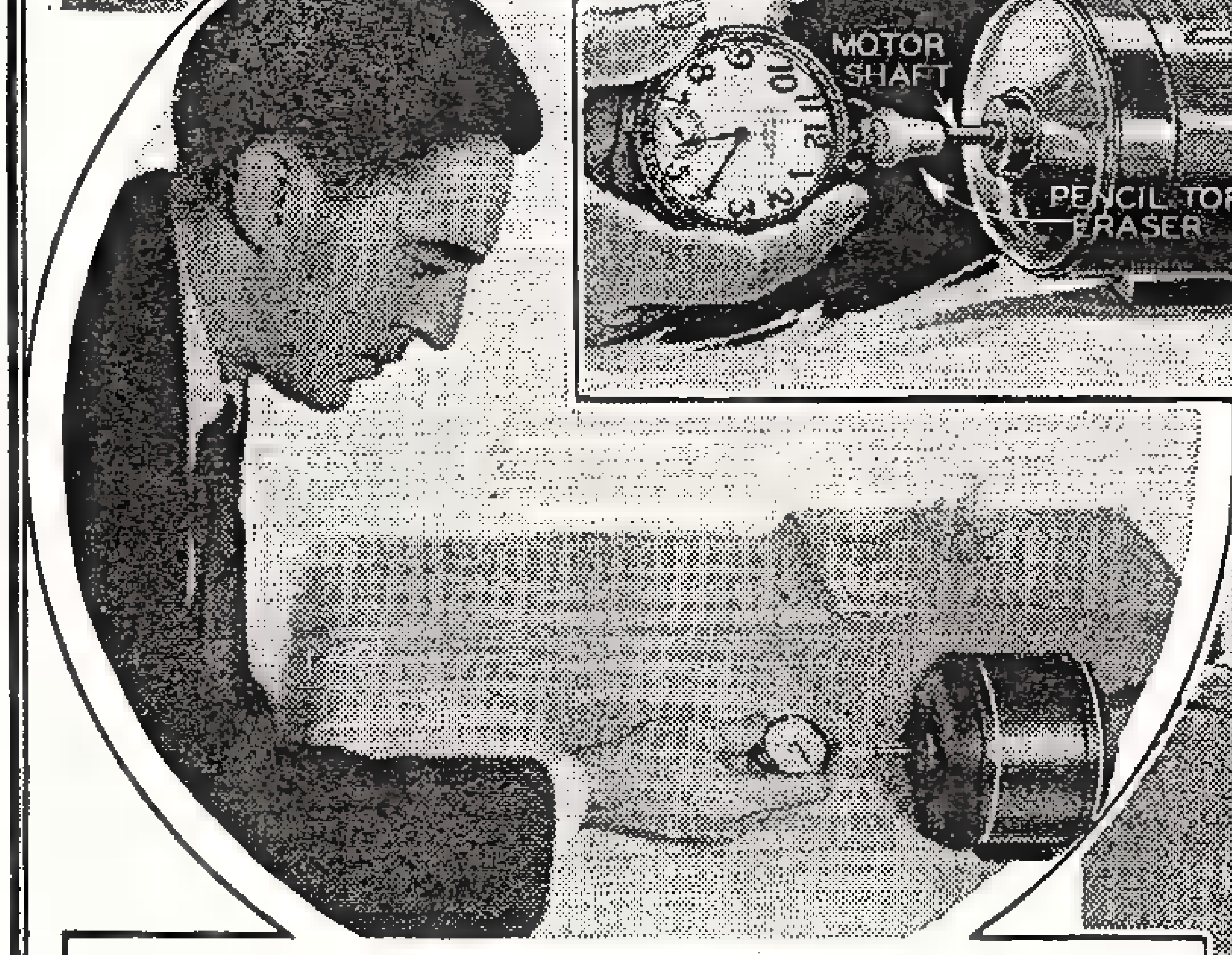


Wooden blocks which displace chemical developer to conserve the liquid are bored with holes and filled with enough shot to make them sink. Nails in the top serve as hooks to suspend blocks from cross pieces. Blocks are of such dimensions that they will fit loosely in the tank, with about ¾ in. to spare, thereby leaving room for two or three negatives at end.

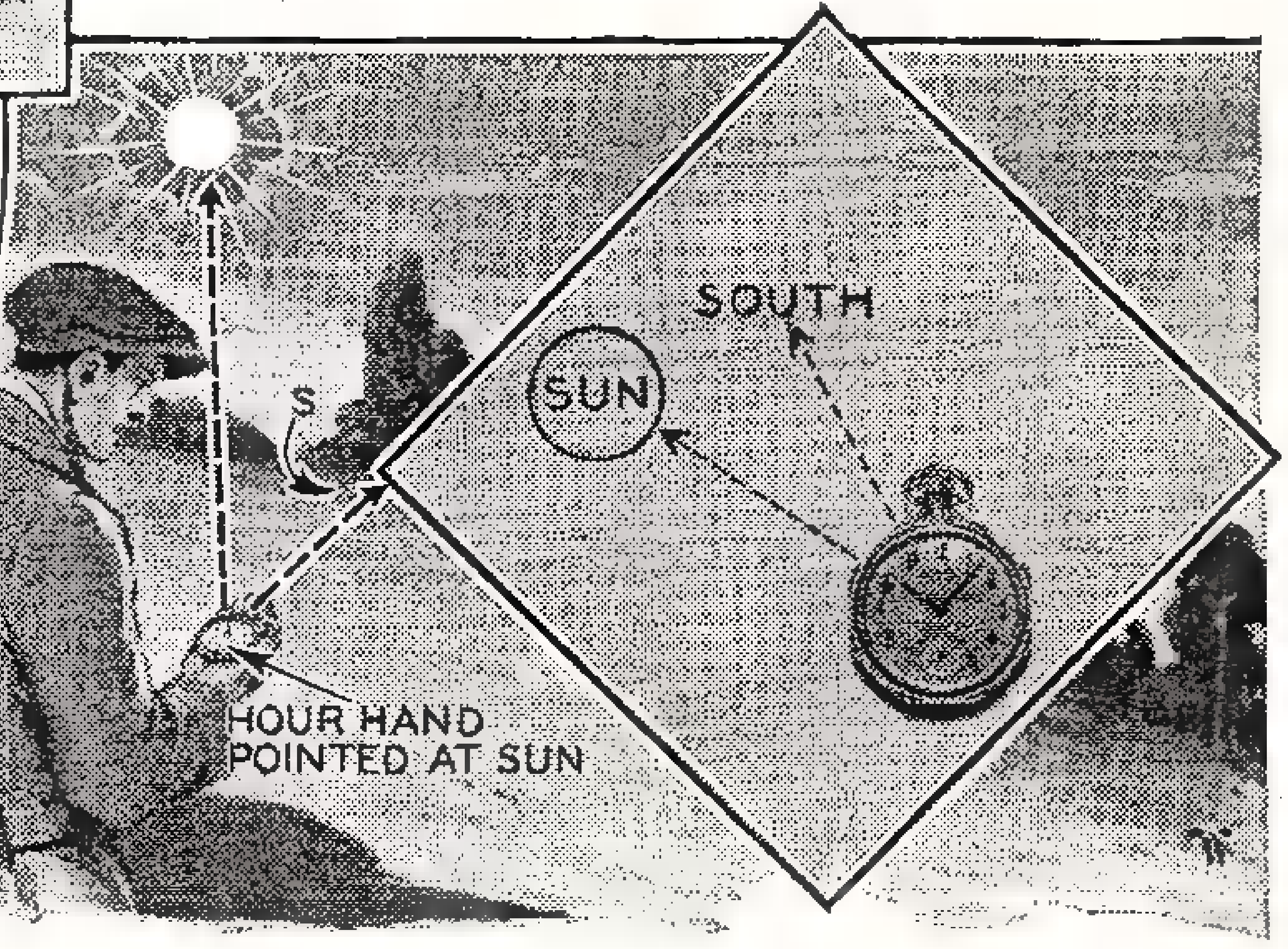
Novel USES for Your WATCH


90
60
45
30
15
0
120
135
150
165
180
ONE MINUTE EQUALS 6°

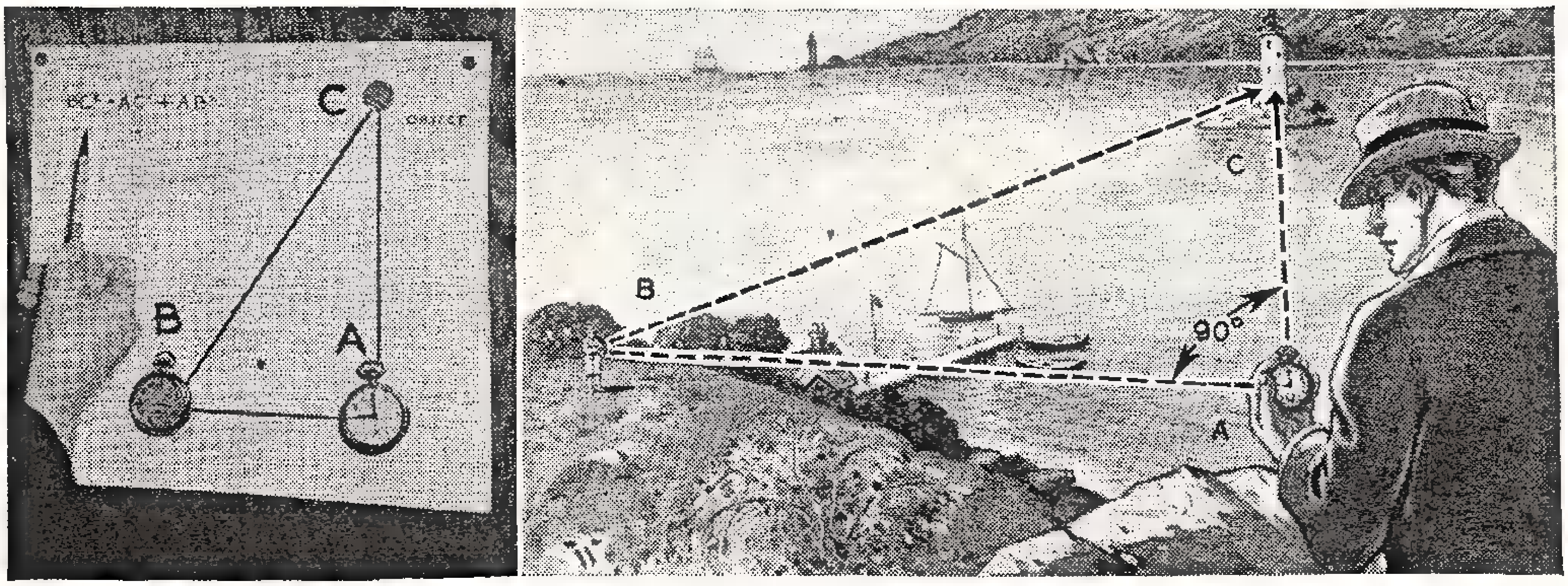
Your watch can be pressed into service as a direction indicator or as a protractor. Each minute division equals 6 degrees; a five-minute division 30 degrees. By laying the watch out on the map as at left, you can locate any point of compass.


MOTOR SHAFT
PENCIL TOP ERASER

In using watch as a revolution counter, the "innards" are removed till nothing is left but the chain of gears between stem and minute hand. Then a rubber pencil top eraser is placed over the stem handle. When this is brought into contact with the revolving shaft and pressed, the minute hand will make one revolution to a large number made by the motor. Naturally the ratio of watch to motor revolutions must be found prior to the test.

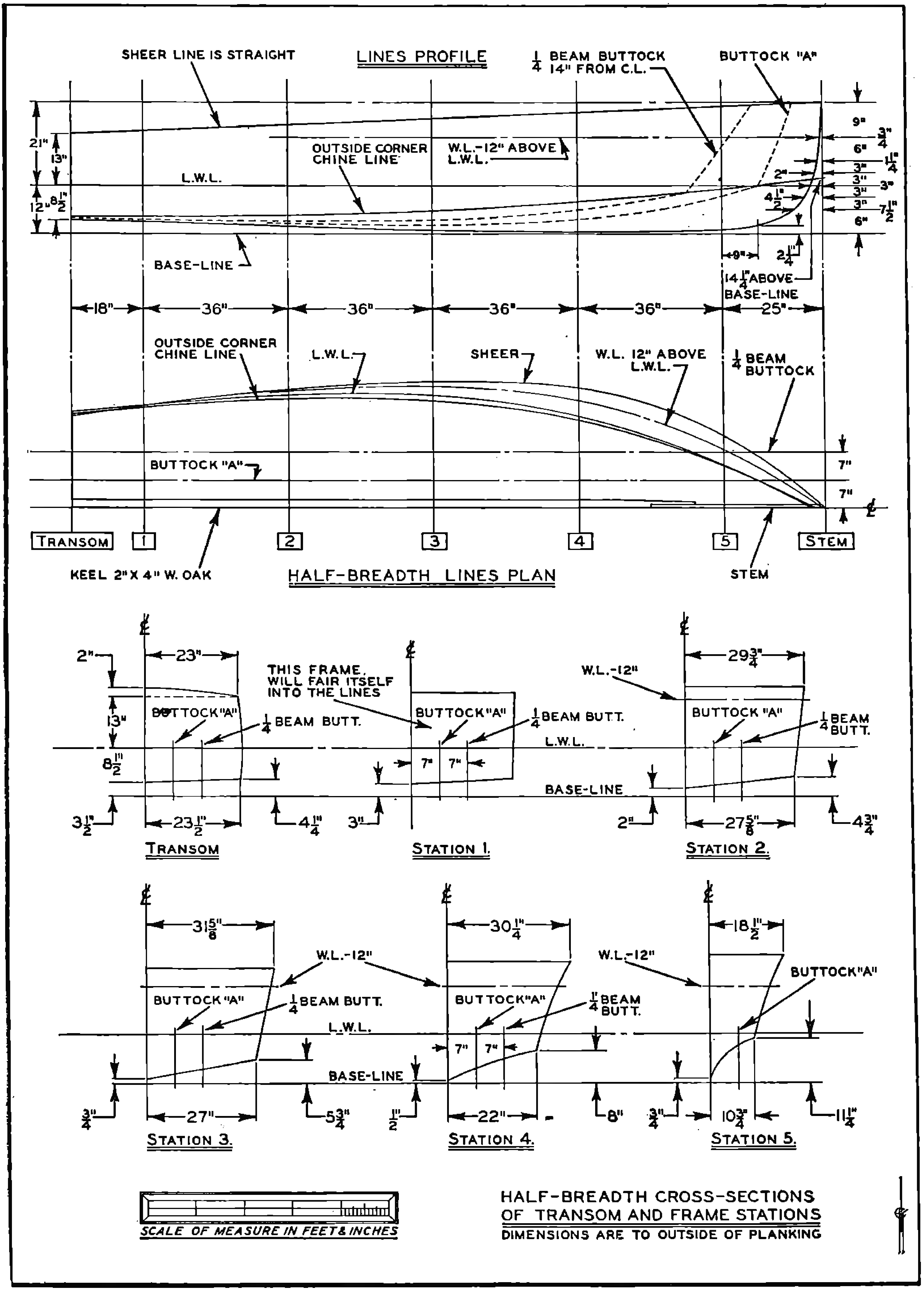

SOUTH
SUN
S
HOUR HAND POINTED AT SUN

To use a watch as a compass point the hour hand at sun. South then lies in direction midway between hour hand and number 12 on dial of watch as shown.

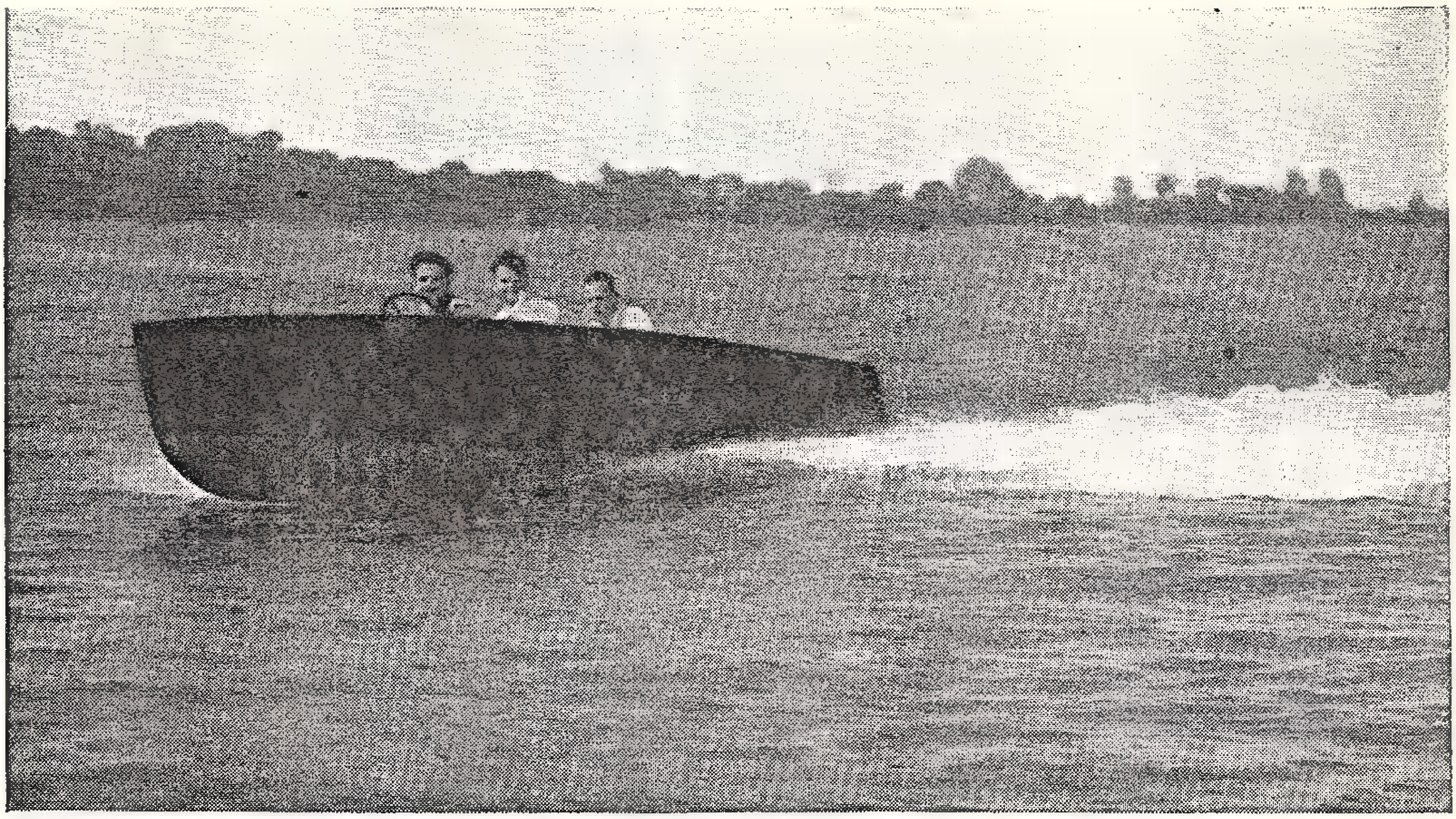

BC²=AC²+AB²
C
OBJECT
B
A
C
B
90°
A

Surveying with your watch requires only elementary knowledge of trigonometry. In measuring unknown distances train hands on the object "C" and point "B" as illustrated above. Distance between point B and lighthouse C is then found by following formula: $BC^2 = AC^2 + AB^2$. Other distances are: $AC^2 = BC^2 - AB^2$, $AB^2 = BC^2 - AC^2$.

Offset Table Contained in These Dimensioned Cross Section Drawings


LINES PROFILE
SHEER LINE IS STRAIGHT
1/4 BEAM BUTTOCK 14" FROM C.L.
BUTTOCK "A"
OUTSIDE CORNER CHINE LINE
W.L.-12" ABOVE L.W.L.
L.W.L.
BASE-LINE
21"
13"
12"
8 1/2"
9"
6"
3"
3 3/4"
1 1/4"
7 1/2"
2"
4 1/2"
2 1/4"
9"
14 1/4" ABOVE BASE-LINE
18"
36"
36"
36"
36"
25"
OUTSIDE CORNER CHINE LINE
L.W.L.
SHEER
W.L. 12" ABOVE L.W.L.
1/4 BEAM BUTTOCK
BUTTOCK "A"
7"
7"
TRANSOM
1
2
3
4
5
STEM
KEEL 2"X 4" W. OAK
STEM
HALF-BREADTH LINES PLAN
23"
2"
13"
8 1/2"
BUTTOCK "A"
1/4 BEAM BUTT.
3 1/2"
23 1/2"
4 1/4"
TRANSOM
THIS FRAME WILL FAIR ITSELF INTO THE LINES
BUTTOCK "A"
1/4 BEAM BUTT.
7"
7"
3"
STATION 1.
W.L.-12"
L.W.L.
BASE-LINE
29 3/4"
BUTTOCK "A"
1/4 BEAM BUTT.
2"
27 5/8"
4 3/4"
STATION 2.
31 5/8"
W.L.-12"
BUTTOCK "A"
1/4 BEAM BUTT.
L.W.L.
BASE-LINE
3/4"
27"
5 3/4"
STATION 3.
30 1/4"
BUTTOCK "A"
1/4 BEAM BUTT.
7"
7"
1/2"
22"
8"
STATION 4.
18 1/2"
W.L.-12"
BUTTOCK "A"
3/4"
10 3/4"
11 1/4"
STATION 5.
SCALE OF MEASURE IN FEET & INCHES
HALF-BREADTH CROSS-SECTIONS OF TRANSOM AND FRAME STATIONS
DIMENSIONS ARE TO OUTSIDE OF PLANKING

Here are the simple but sweet lines of this little flyer. Top half of the page shows the outboard profile and the plan half breadth. Measurements for cutting the stem are shown on the profile. Below are the sections with the offsets, or frame measurements as they might be termed. They give all needed dimensions for laying out the drawing full size.



Scram banks her turns like an airplane. Thrill-rides by the bushel are yours in this boat! Here the designer (left) and Earl Hilburn, Junior and Senior, put the little flyer through her initial paces [illegible] few minutes after she was launched.

PLANS for "SCRAM"

None other than your old pal Westy Farmer here tells about the long anticipated boat, Scram. She is fifteen and one-half feet of dynamite, and will push 40-per with a Ford A engine.

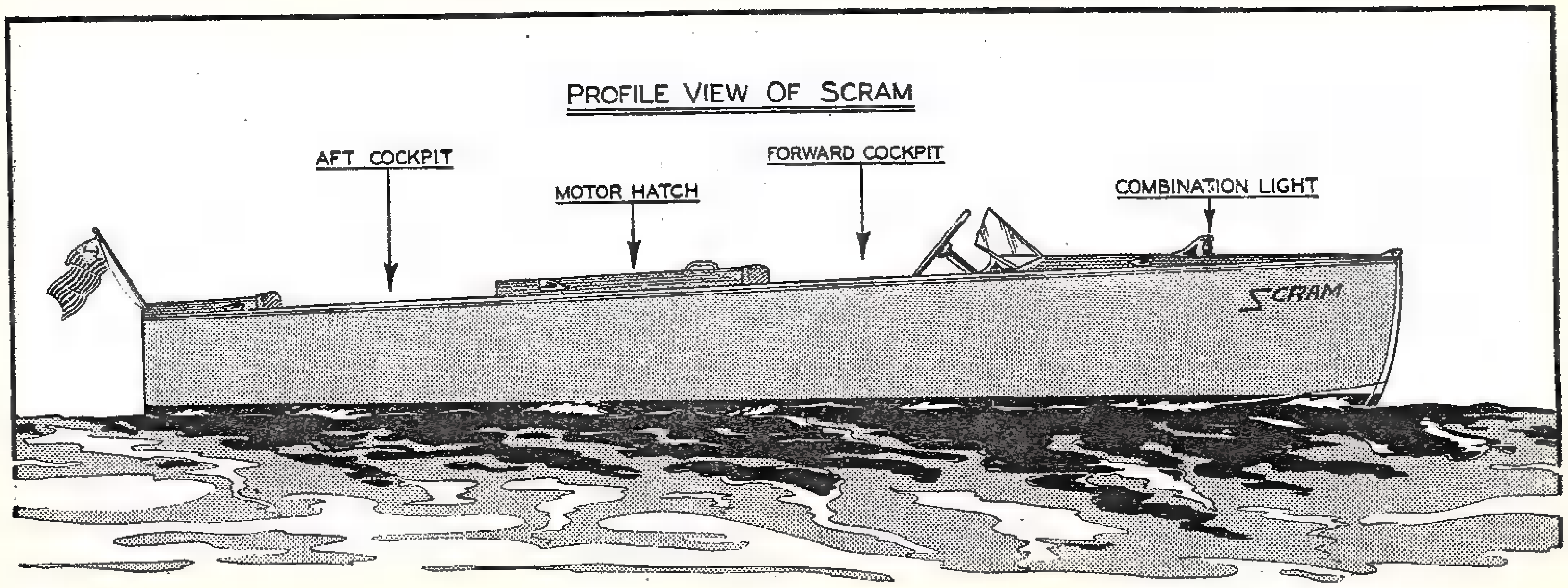
SCRAM is a fitting name for a boat that has the flash, the sheer brilliancy of performance that this one has. And here she is at last!

Can *Scram* travel? Wowie!! You get in her comfortable front cockpit alongside the dock. *Scram* willingly shifts weight a little and the water bubbles a bit. You settle into the seat and press the starter button.

The downdraft carburetor shoots a gooseful of gasoline into the intake manifold, and the engine comes to life like a machine gun.

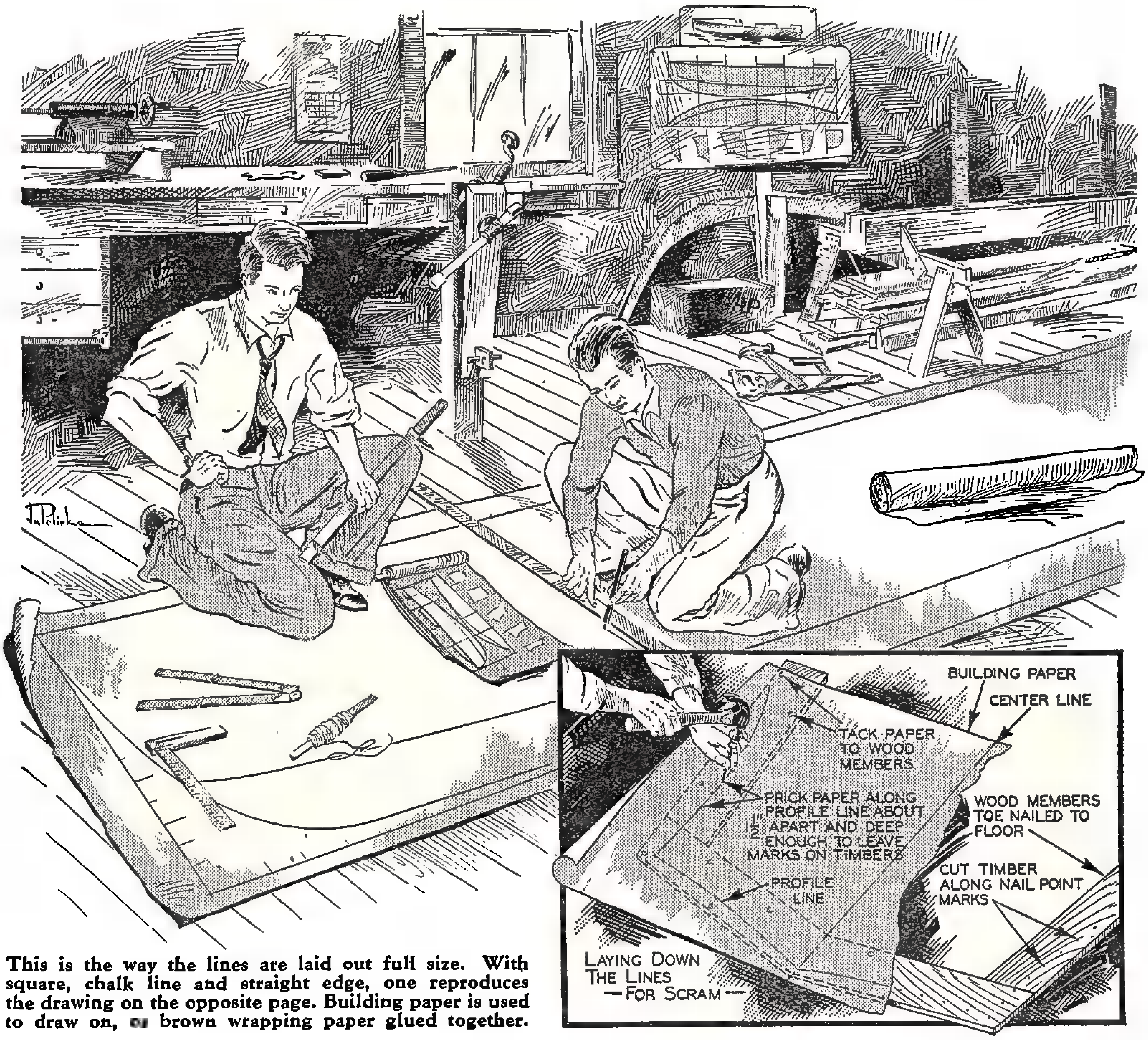
Then there is the cast off of lines, the threading out into open water as the engine ticks along. With wide water on all sides, you shove the gun to her and—*watch out!!*

You are going right out through the back



Scram's layout is typical of standardized boats built by famous boat factories. She is 15½ feet long [illegible] ft.-3 in. beam, weighs about 850 pounds ready to launch. She will seat five people comfortably, and is very dry for her type.

Minor Errors in Design Are Eliminated by Laying Out the Boat Full Size


BUILDING PAPER
CENTER LINE
TACK PAPER TO WOOD MEMBERS
PRICK PAPER ALONG PROFILE LINE ABOUT $\frac{1}{2}$" APART AND DEEP ENOUGH TO LEAVE MARKS ON TIMBERS
WOOD MEMBERS TOE NAILED TO FLOOR
CUT TIMBER ALONG NAIL POINT MARKS
PROFILE LINE
LAYING DOWN THE LINES —FOR SCRAM—

This is the way the lines are laid out full size. With square, chalk line and straight edge, one reproduces the drawing on the opposite page. Building paper is used to draw on, or brown wrapping paper glued together.

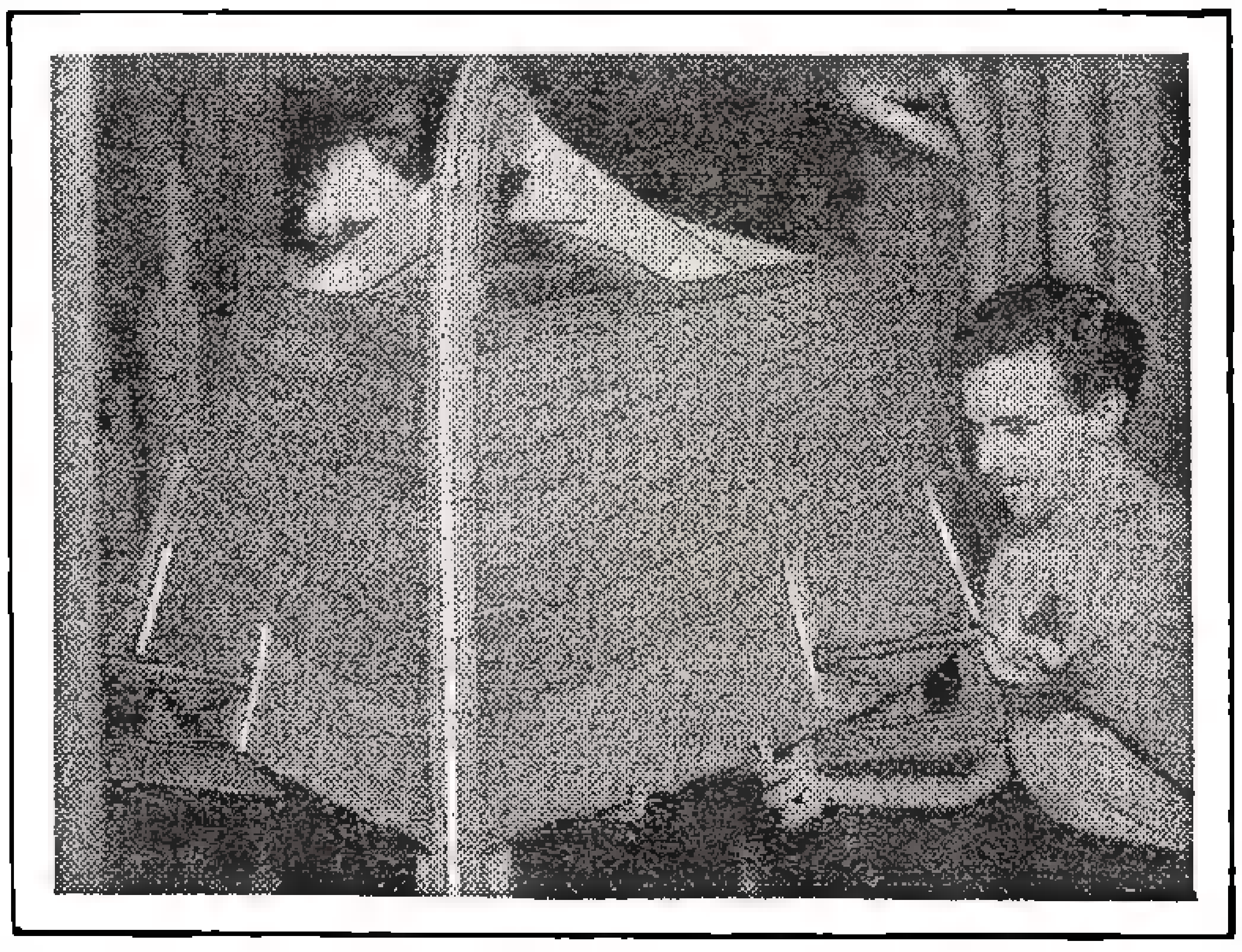
end—no—that seat holds! What is this, an airplane? My word! Just a boat? Well, what a boat! Yippee!!

In ten shakes of a ram's tail she seems to lengthen into a thirty footer as her snoot comes out and levels down. She seems to reach for distance, and how she does eat it up!

The buoys marking the channel go by like a picket fence. You glance around at the wake and it seems flat, furious and two miles long. Her bottom gently spanks the wavelets with an eager, hungry rat-a-tat tat—the spray thrown out by the hull alights again in the fraction of a second, but in that fraction you have gone fifty feet. Then fifty feet more, then hundreds, then thousands and still there is that eager wind-sweeping roar for more miles which this little terror wants to chew up.*

You settle back to the wheel and are comfortable. The boat does all the work, effortlessly and smoothly. You are satisfied. And why not?

You have a boat that smacks a lot of the *Dodge* 16 footer, which is a mighty popular and good craft. Your *Scram* can hardly be told from a *Chris Craft* 15½ footer, and indeed there is a lot of that little standardized, widely marketed boat in her. But your *Scram* has cost you less, looks exactly like a factory built job, and can show a clean pair of heels to any of this kind of small two-



After the boat has been set up as shown the topsides are planked. Pads are used under all clamps to avoid marks.

***Vas you there, Charlie?**

Scram Is Known as "Tiny Terror" in Home Waters Because of Her Speed

One wouldn't think this slumbering little boat capable of showing her heels handily to most all the standard manufactured boats turned out by nationally known builders, but she "can do"—and has walked away from stock boats of her size so often, and by such easy margins, that she is now known as the "Tiny Terror" in her home waters.

cockpit type of runabout now on the market. Pushing forty miles an hour in a boat this size is a real thrill.

Scram Is Evolution of Other Designs

This very latest design of mine is the result of experience gained in turning out close to 175 boat designs. I knew from the letters people were sending me that a really flashy little boat of a size that could be built in any garage would prove the answer to the prayers of a lot of experienced, capable builders who needed only the design laid before them to get them started with a saw and hammer. Beyond any doubt it seemed to be the one boat everybody wanted.

So I compared the data I had amassed with the performances of modern production jobs, learned what I could from them, and this boat resulted.

First Steps in Building

Of course the first thing to do is to lay down the lines full size. This must be done with any boat.

Make sure your shop has a floor sufficiently hard and smooth to enable you to lay down a strip of brown wrapping or building paper on it. Then with a good, long straight edge mark off the baseline, the water lines and the perpendiculars as shown on the lines profile drawing, page 108. If the sheet of paper is not large enough to do this it can be glued in several strips until it is wide enough.

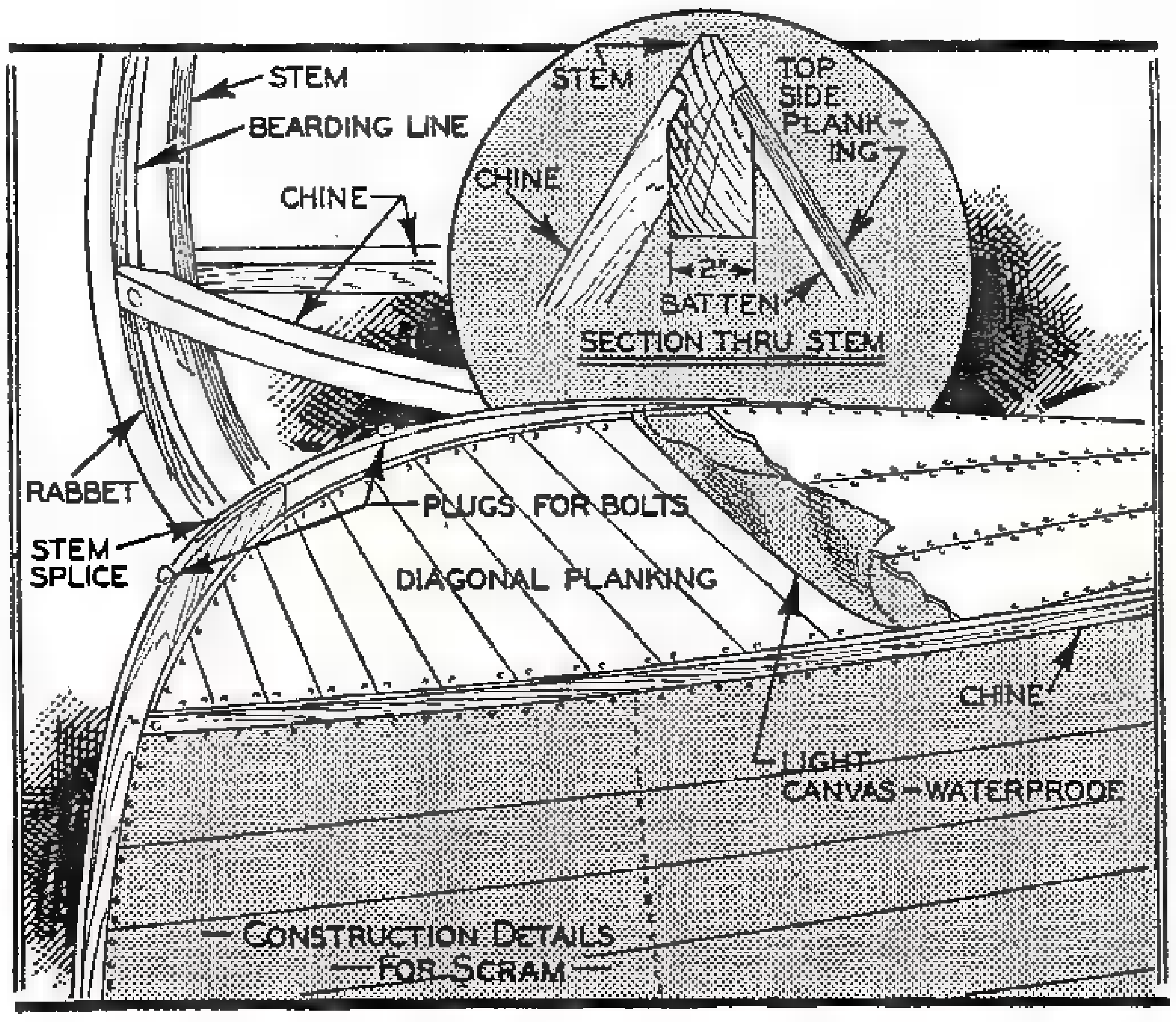
Then using the dimensions given in the sectional views at the bottom of the drawing on page 108, set in the points along the stem, sheer and keel. Join these all up with a fair line. If there are one or two points that seem obviously out of line disregard them. You see, the dimensions are taken from the original drawing which is made 1/16th the full size of the final boat, and

(Continued on page 142)

BLUEPRINTS OF "SCRAM"

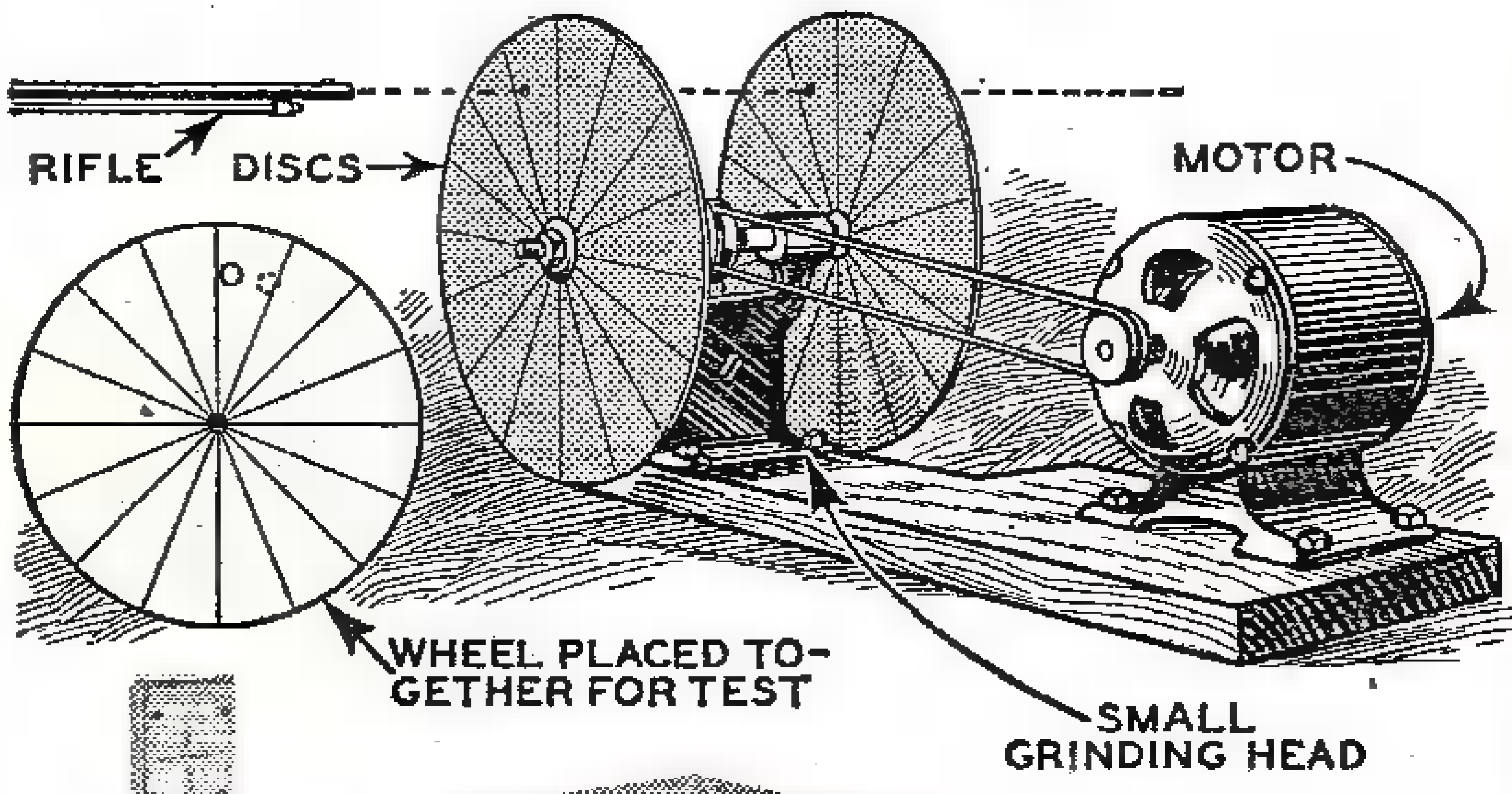
Although all the details for the construction of Scram will be run in subsequent articles, we are now selling complete sets of blueprints for this wonderful little flyer at $3.00 the set. All dimensions and material details are covered in the plans, which come in one long roll. If you want to get started without waiting for the succeeding issues, get these prints and get going now! Address

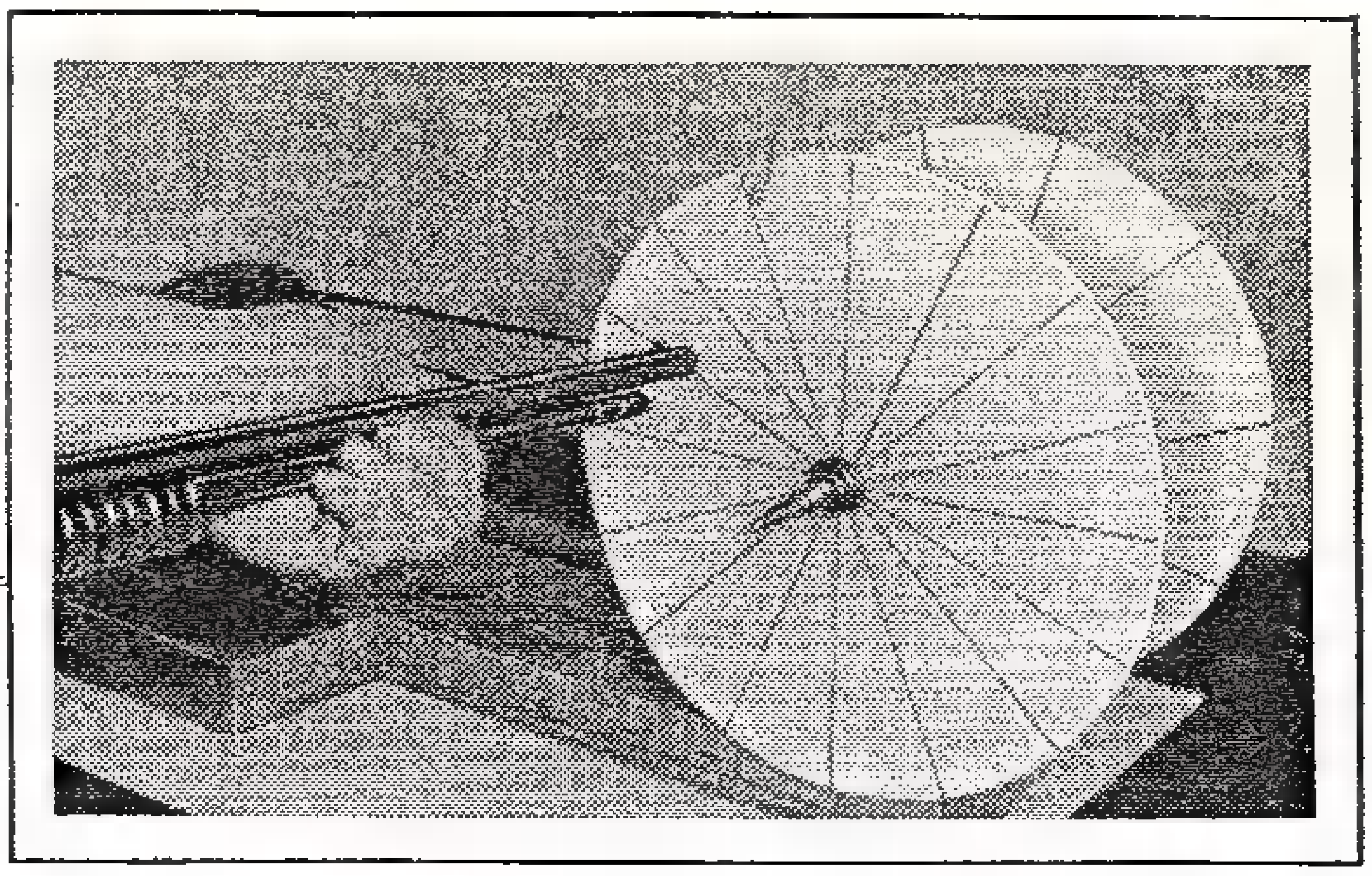
Blueprint Department
MODERN MECHANIX AND INVENTIONS
529 So. 7th St., Minneapolis, Minn.



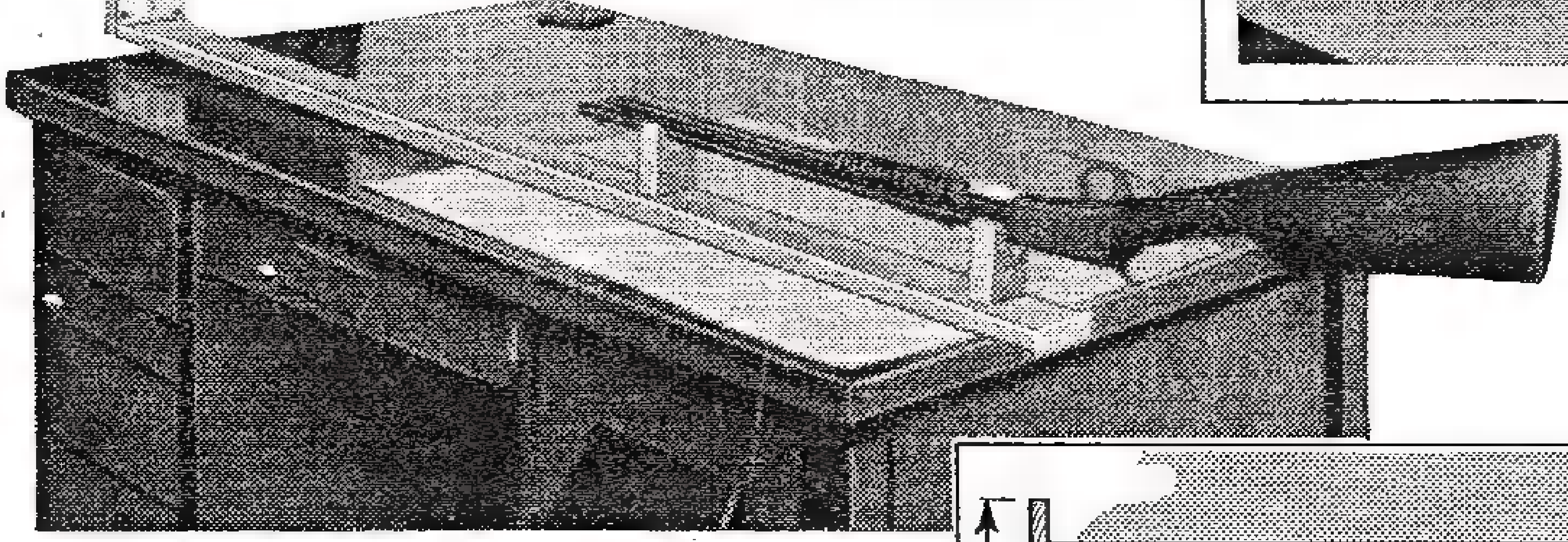
The double bottom used in Scram is really easier to build than any other type. This gives a cut-away view of plank and stem details.

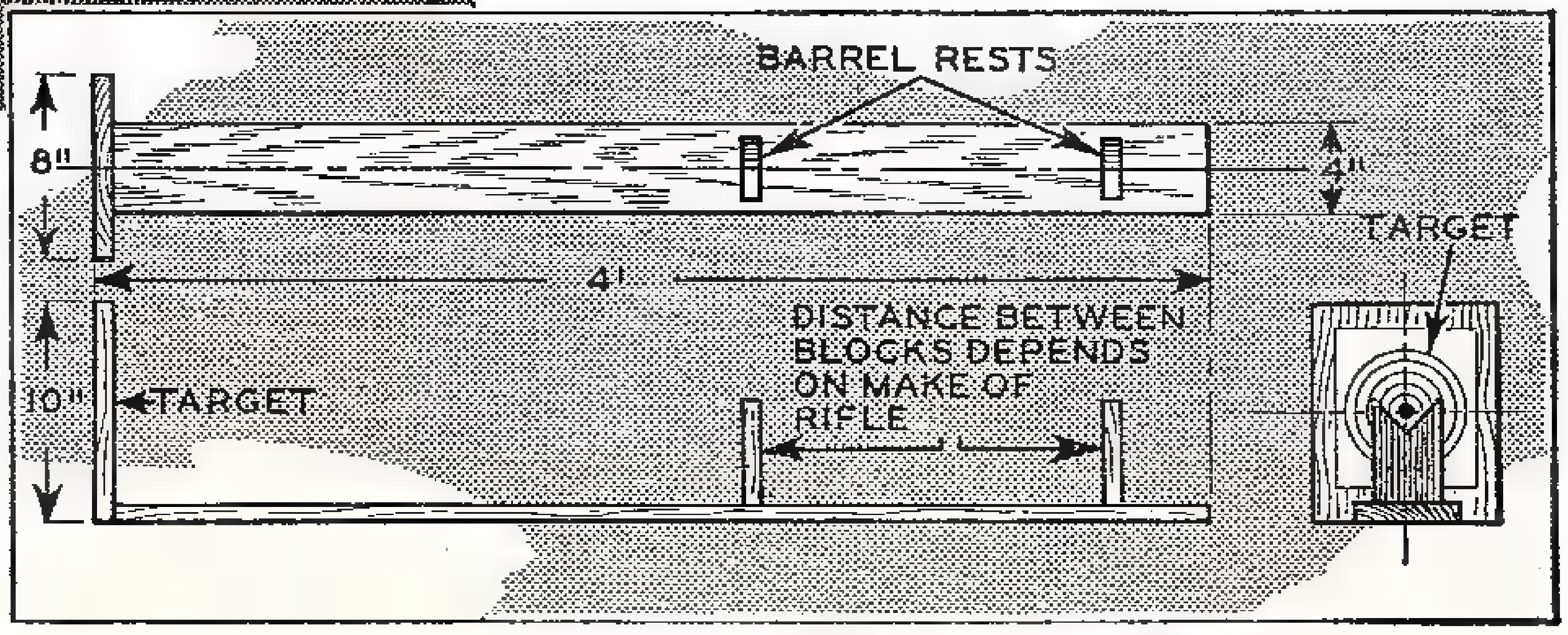
Simple Tests for Accuracy of Your Rifle



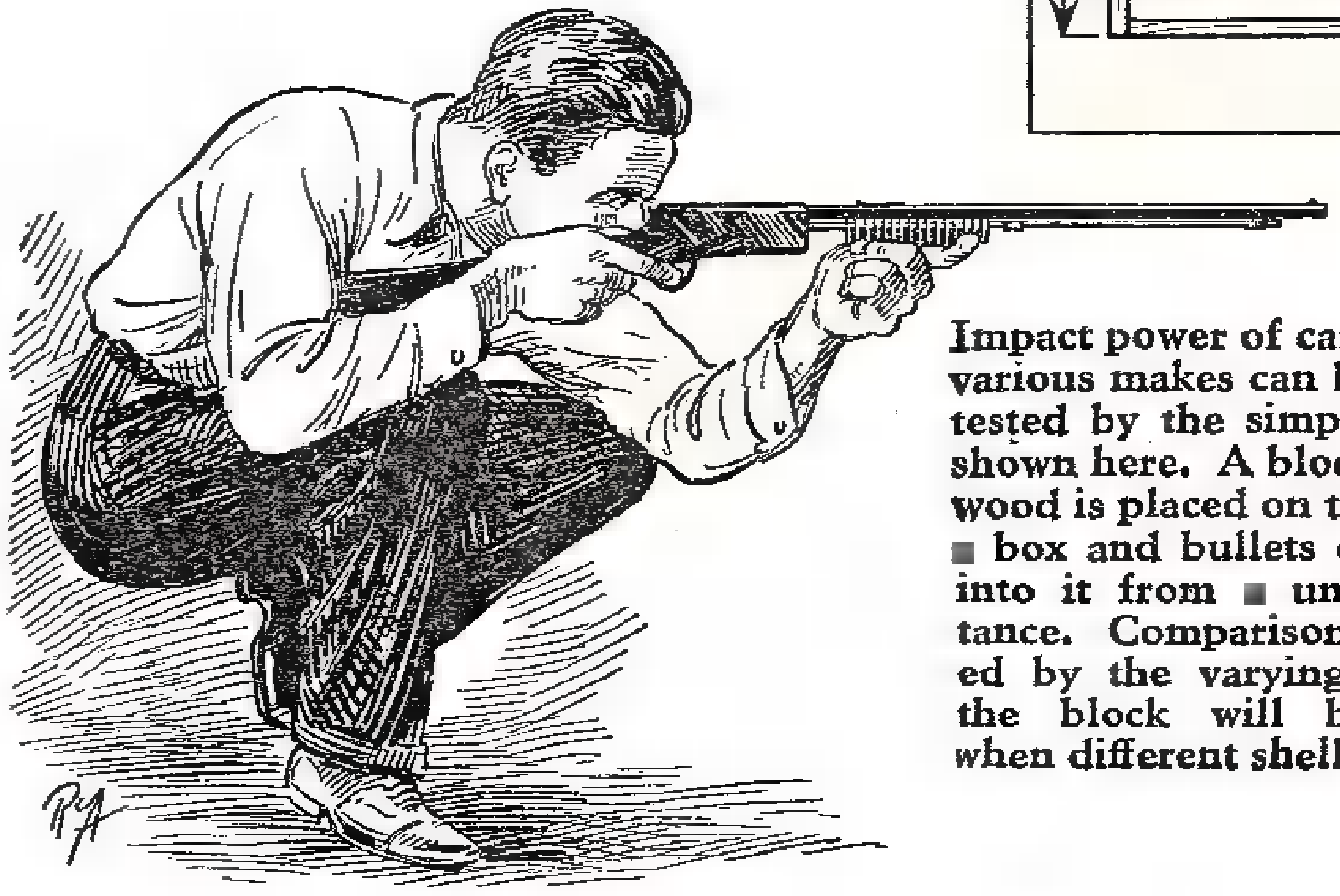


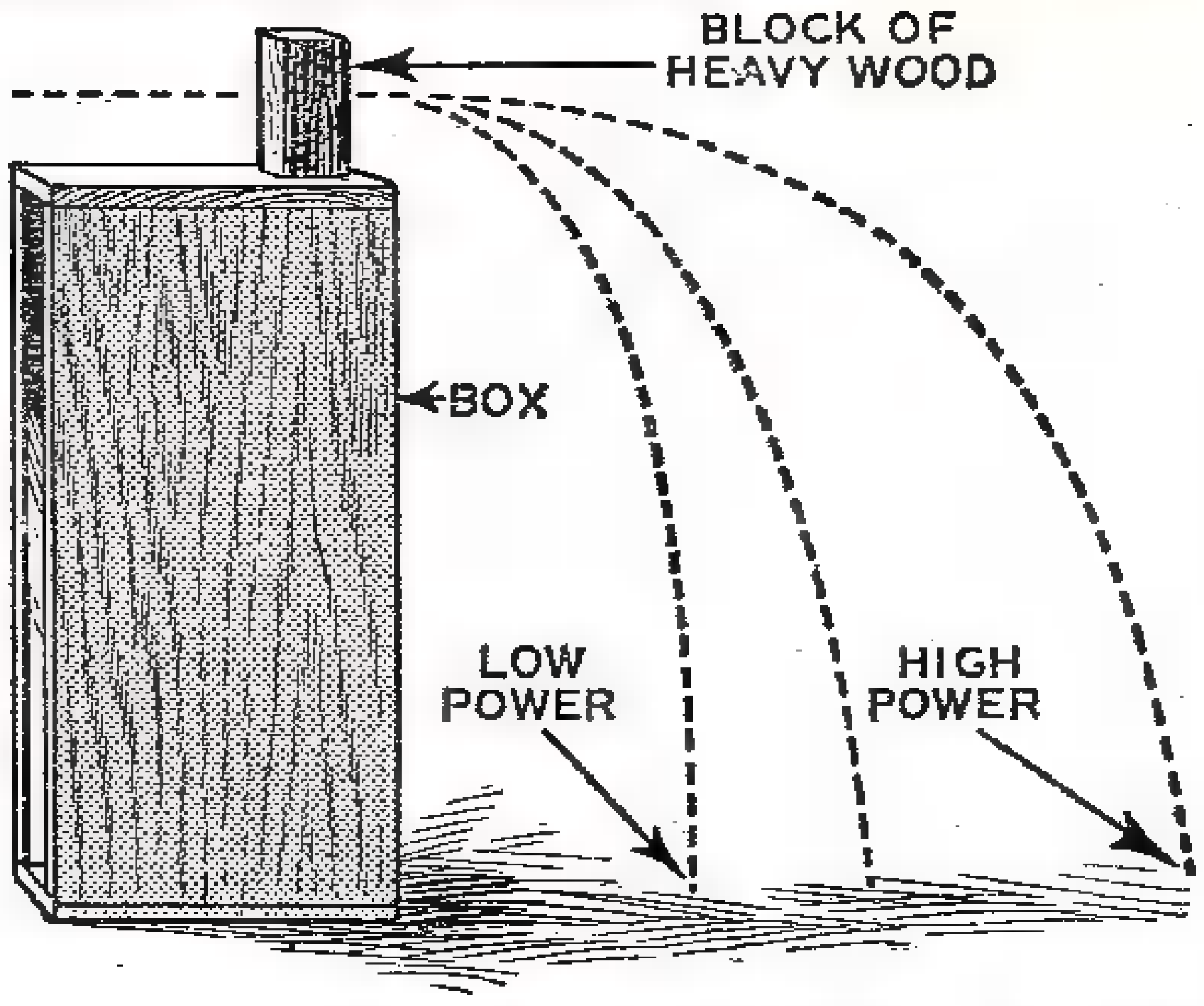
Comparative bullet speeds are tested by device shown above and in drawing at left. Twin disks, spaced apart on shaft, are driven by motor. Bullet fired through first revolving disk strikes the second which has advanced slightly farther, enabling comparison to be made.





To test accuracy, rifle is mounted on blocks as in photo above and drawing at right. A shot is fired at target; then gun is revolved 40 or 50 degrees to right and left, and another shot fired. All bullets should strike same spot; if they overlap, inaccuracy is indicated.





Impact power of cartridges of various makes can be handily tested by the simple method shown here. A block of hardwood is placed on the edge of a box and bullets discharged into it from a uniform distance. Comparison is afforded by the varying distances the block will be thrown when different shells are used.

OWNERS of rifles can put them through several practical tests by the use of simple improvised apparatus.

In the test for accuracy, the rifle is set upon a pair of very accurate V-blocks, as shown in the photo. Blocks such as are used in machine shops are ideal, if available, but carefully cut wooden blocks will function well. These blocks are mounted on the end of a board in such a way that the barrel of the gun will rest in them on a true axis. Blocks should be mounted as close to the center of the board as possible, in line with a target at the other end.

Mount the gun and fire a shot at the target. Twist the barrel 40 or 50 degrees, to right and left, and note the results. If the barrel is accurate, only one perfect hole should result. Overlapping edges are proof of an inaccurate gun barrel.

The power test (used by experts) requires nothing but a block of heavy wood, placed on the edge of a box as shown. Quality of cartridges can easily be compared by firing different makes into the block from a uniform distance, at close range, and noting the varying distances which the block is knocked by the bullet impact.

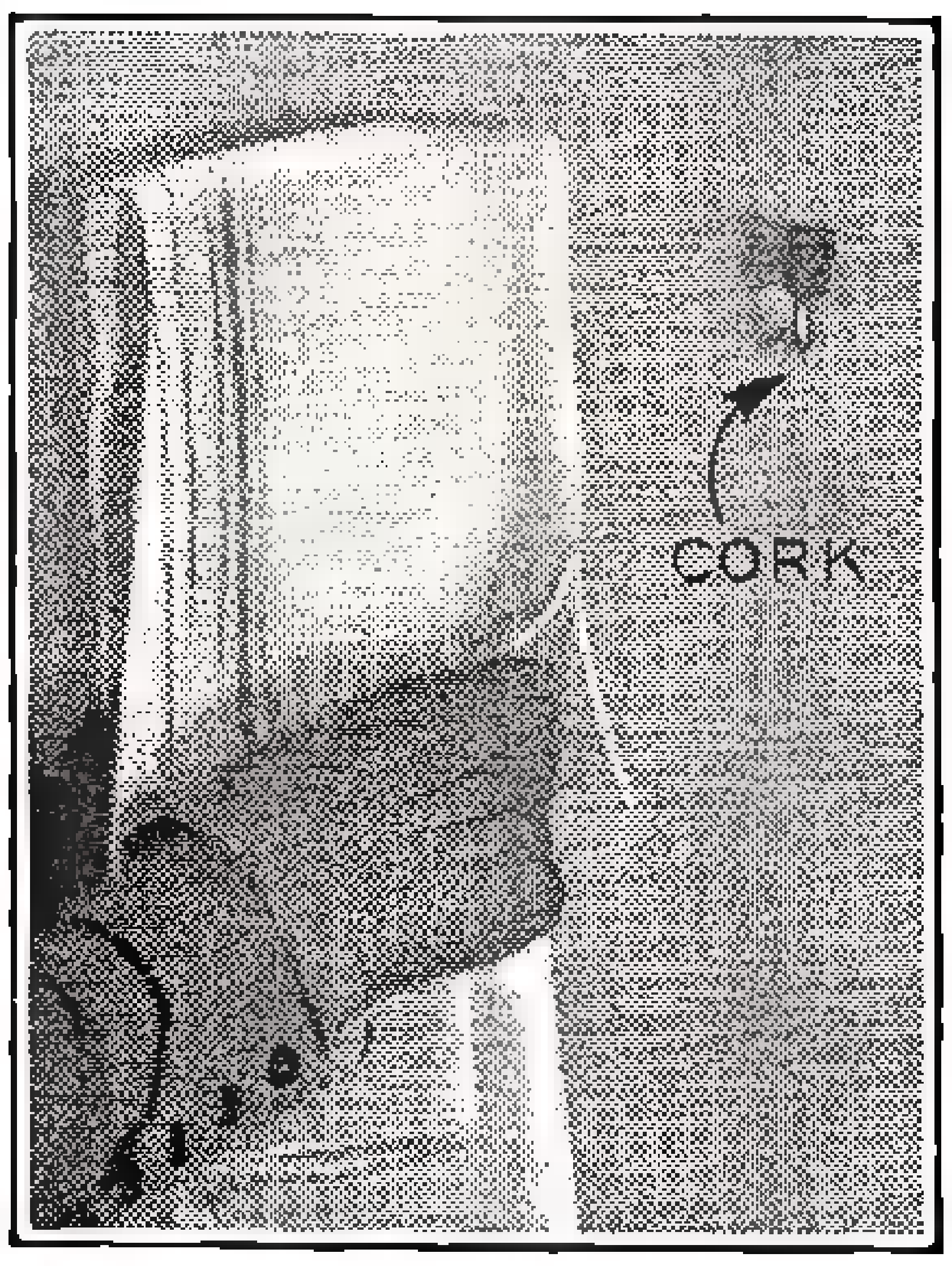
Poor ammunition is shown up in still another test for bullet speed. A high-speed motor is set up to drive two cardboard disks, in the manner illustrated. When the disks are revolving and a bullet is fired at right angles to their plane of rotation, it will pass through each disk, but there will be a time interval between the bullet's striking the first disk and the second one—during which time the second disk has naturally traveled farther, causing the bullet to strike it at an advanced position which can be compared by means of radial lines on the cardboard. These, of course, must be lined up before firing.

A Page of Simple, Ingenious Kinks for the Household

Light Globe Makes Burglar Alarm

THE simplest and most serviceable burglar alarm you can devise is an old burnt-out electric light globe placed on a chair as illustrated at the right. When the chair is placed against an outside door, the slightest jar or movement will throw the bulb off the chair. The explosion of the bulb will frighten away the intruder and sound an alarm to all within earshot. A 60-watt bulb will suffice.

Cork Protects Towel on Hook

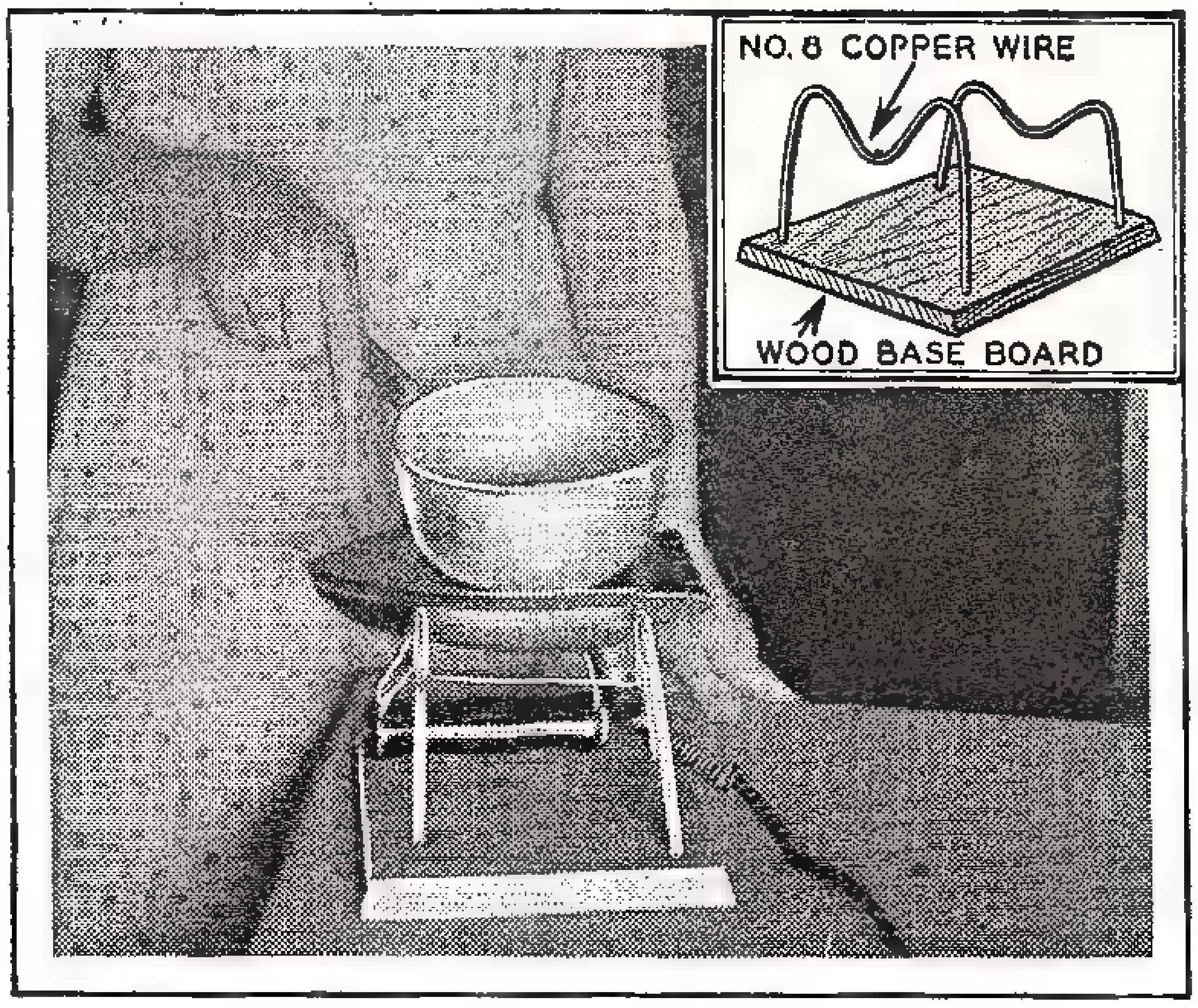


Small bottle cork placed over point of wall hook protects towel.

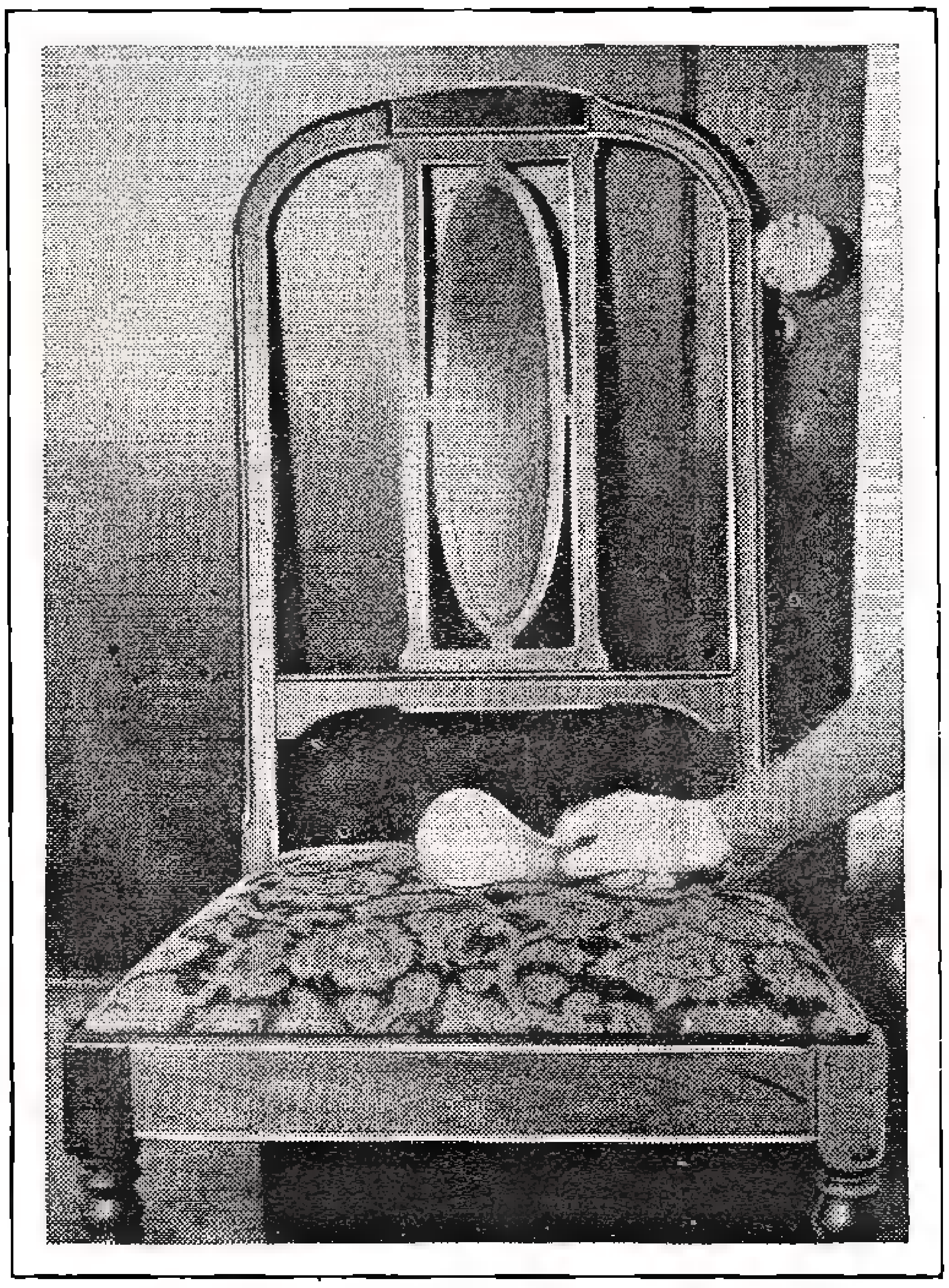
A WALL hook makes an excellent towel holder but the point has a way of punching unsightly holes in the cloth. The way to get around this is to place a cork over the point as illustrated at the left. Then the towel can be hung up without doing damage. Cork for 16 oz. bottle is needed.

Electric Iron Does Duty as Stove

MANY times one wishes one had a small electric stove to heat small amounts of water or other liquids. If you have an electric iron, you may convert it into a serviceable "stove" by means of the simple frame shown below. All that is required is a piece of wood about eight inches square for the base and two small iron rods or very heavy steel or copper wire. The operation of the contrivance is shown plainly in the photo below. Paint in light colors with good enamel.



Electric iron rests in wire frame to make a handy improvised stove. Small quantities of liquids quickly come to boil.



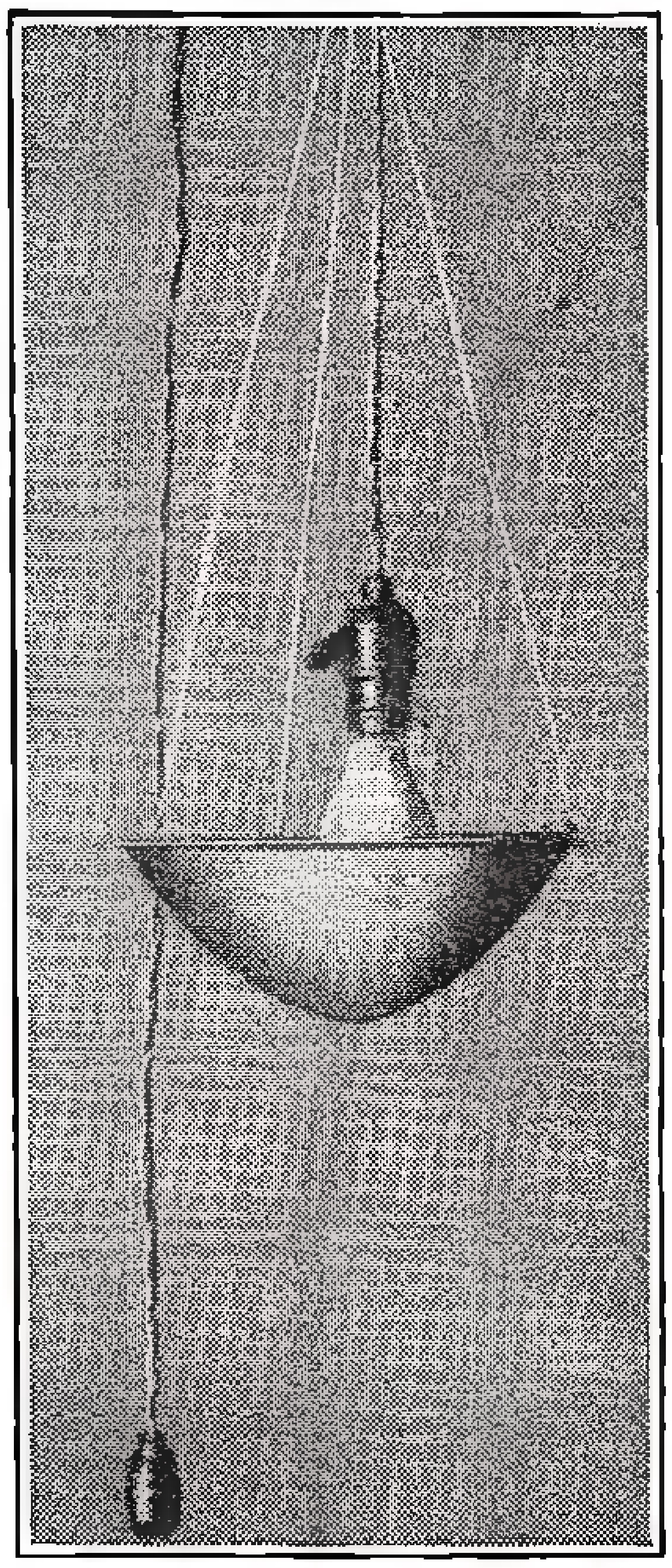
Sure fire burglar alarm is contrived by placing bulb on chair.

Indirect Lighting From Reflector

AN EASILY made and inexpensive lamp shade that will give an indirect system of lighting can be constructed from an old automobile headlight reflector procurable at any junkyard.

As shown in the picture, the reflector is suspended under the electric bulb by three wires so that the light is reflected to the ceiling and the whole room is evenly illuminated. There are no shadows and the absence of glare more than counterbalances the slight decrease in light from the loss by reflection.

The shade and wires are suspended from the ceiling and may be decorated. Adjust the shade so that direct light comes about 2 feet down the wall from the ceiling.

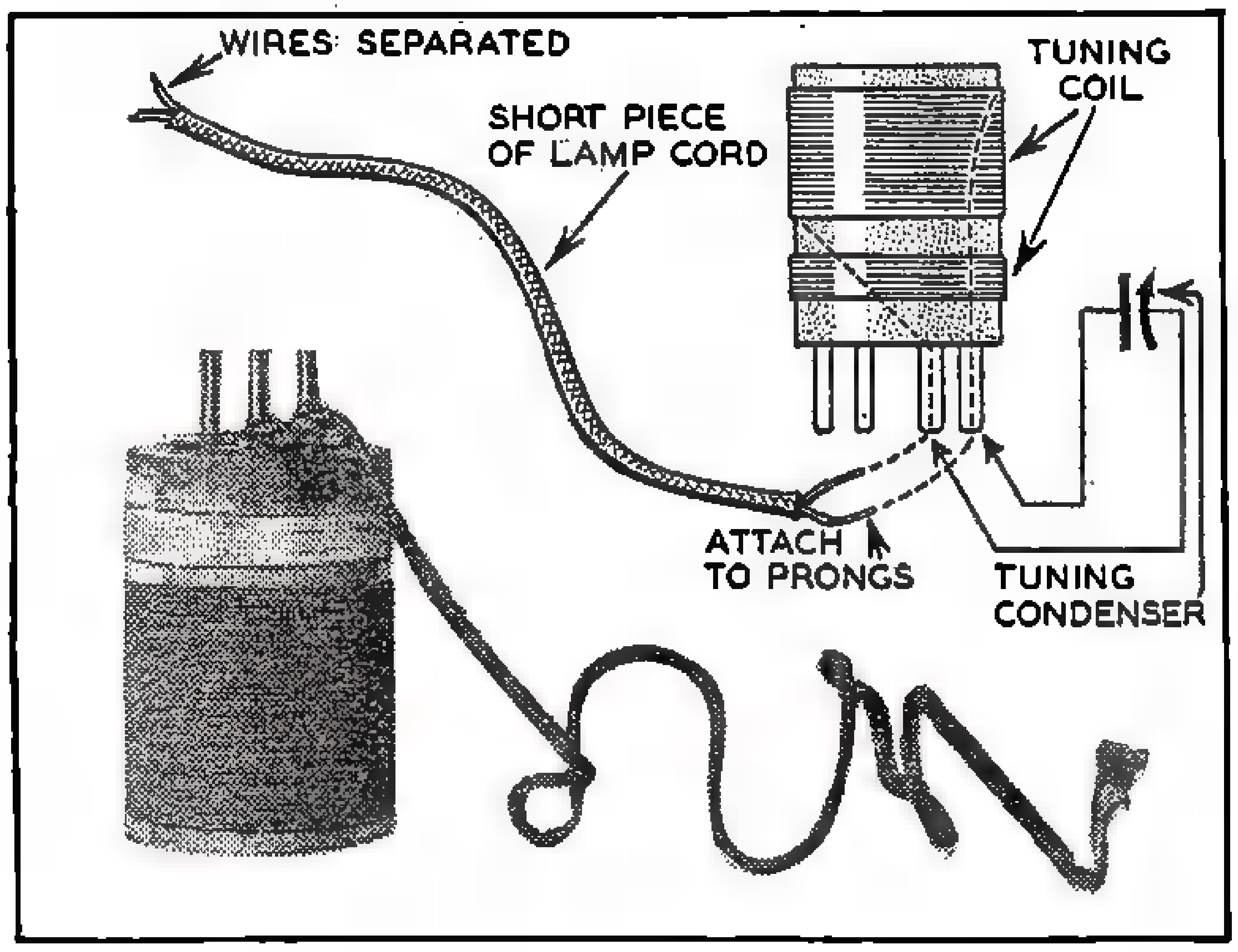


Reflector suspended by wires throws light to the ceiling.

SPARKS from the RADIO EDITOR

Edited by L. B. ROBBINS

Lowering Frequency of Short Wave Coils

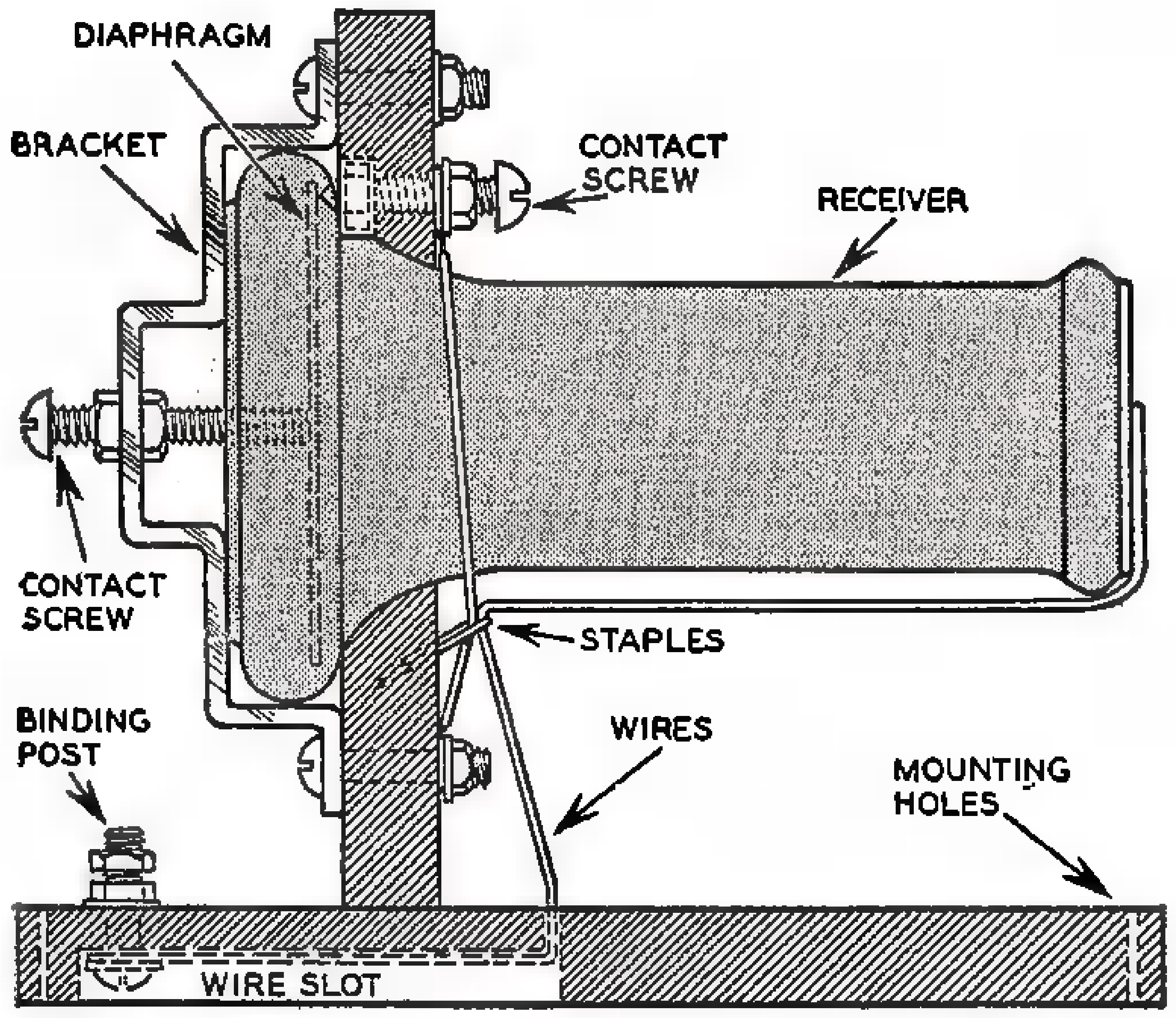


Frequency of coil is lowered by attaching wires to prongs as shown here. Wires act as a midget condenser across coil.

WHEN you find you've wound your short wave coils so that they run too high in frequency, and cannot be tuned down to the desired wavelength, try this little stunt for adding extra capacity to the windings. A piece of double strand electric light cord is cut off about a foot long for each coil. One end of each is then split and the wires bared. These ends are then wrapped around the two prongs of the coil base that held the terminals of the grid or R.F. tuning coil. The wire is stuffed out of the way into each coil form. When the coils are plugged in, presto! the wavelength is lowered into the middle of the desired band. Some experimentation in wire lengths may be necessary.

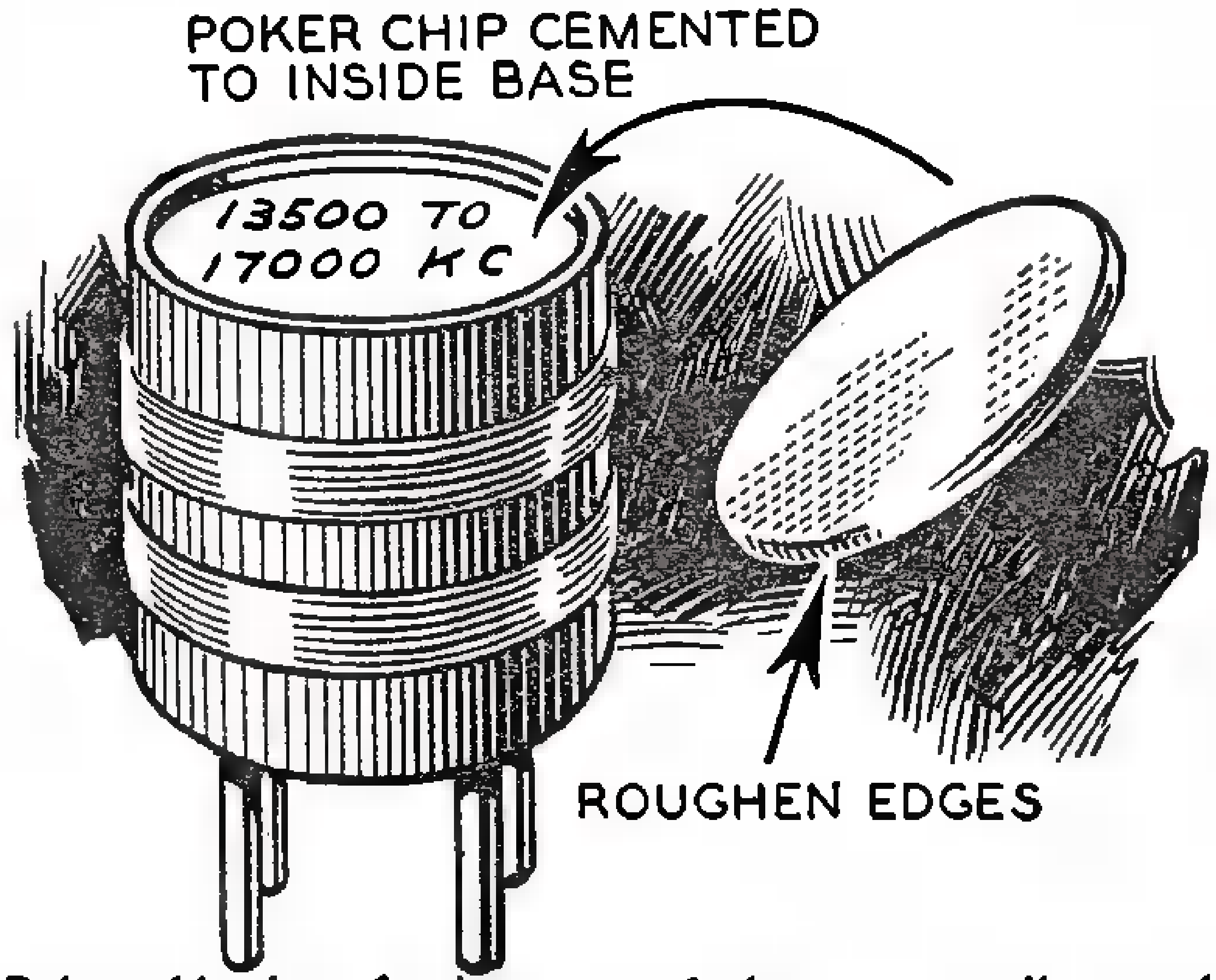
Code Buzzer From Phone Earpiece

AN OLD ten ohm telephone receiver can easily be made into a buzzer as illustrated in the drawing below. The earpiece is mounted in a wooden upright and held securely in place by the frontal bracket. A contact screw presses against the center of the diaphragm and another against the edge. The diaphragm and the contact screws are wired in series with the receiver's magnets. Notice that part of the receiver case must be removed to mount the pointed contact screw. A key and 6-volt battery completes equipment.



Circuit of code practice buzzer is same as standard buzzer, the diaphragm and contact screws being wired in series with the receiver's magnets. Adjust note with contact screws.

Poker Chips Identify S. W. Coils


POKER CHIP CEMENTED TO INSIDE BASE
13500 TO 17000 KC
ROUGHEN EDGES

Poker chip just fits into top of short wave coil wound around tube base. Cement holds chip firmly in place. Wavelengths are numbered on for instant identification of coil.

IT IS an easy matter to get the wrong coils in the receiver if they are not clearly marked. A fine way to identify all coils in a set is to use red, white and blue poker chips. Ordinary chips will just fit inside a tube base coil. Use blue for 160 meters, red for 80 meters, and white for 40 meters.

Roughen the edges of the chips with sandpaper and then spread Duco cement on them and press into the tops of the bases. When dry they will stay in permanently. They can then be marked for exact identification of range in kilocycles with black ink.

It may be necessary to scrape out the inside of the base slightly to secure a snug fit for the clip.

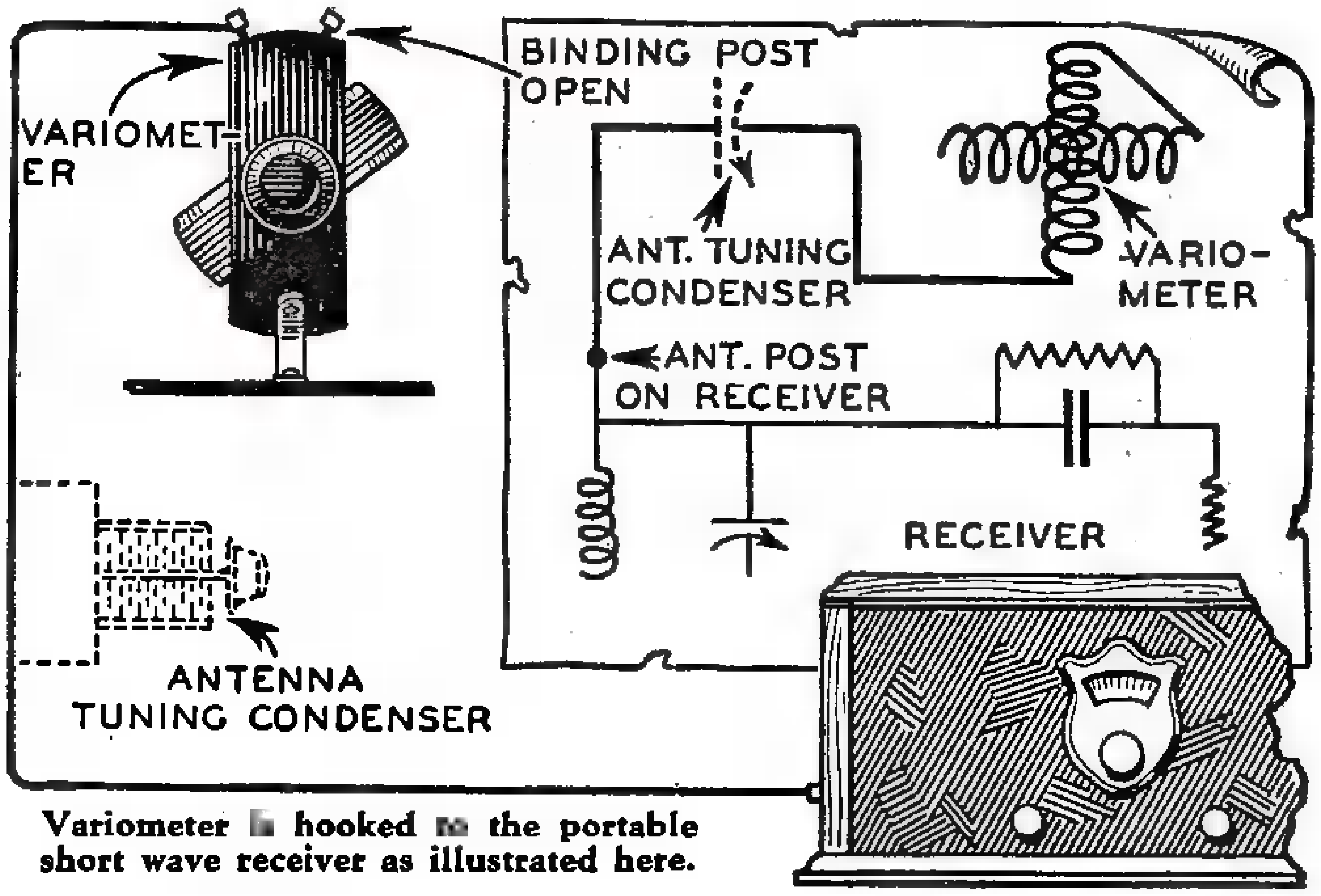
Old Variometer Makes Aerial for Portable S. W. Receiver

FOR using a short-wave receiver as a portable outfit or in a place where the erection of even a short antenna is out of the question, you can employ the scheme shown here with very good results.

The pick-up device consists of one of those old variometers so common in battery receivers some few years ago.

Most every amateur radio builder has one lying around the shop and radio stores will dish them out for a pittance. The rotor is connected in series with the stator. Only a short piece of wire, perhaps two to three feet long, is necessary for connecting. For local reception 6 inches of wire is enough.

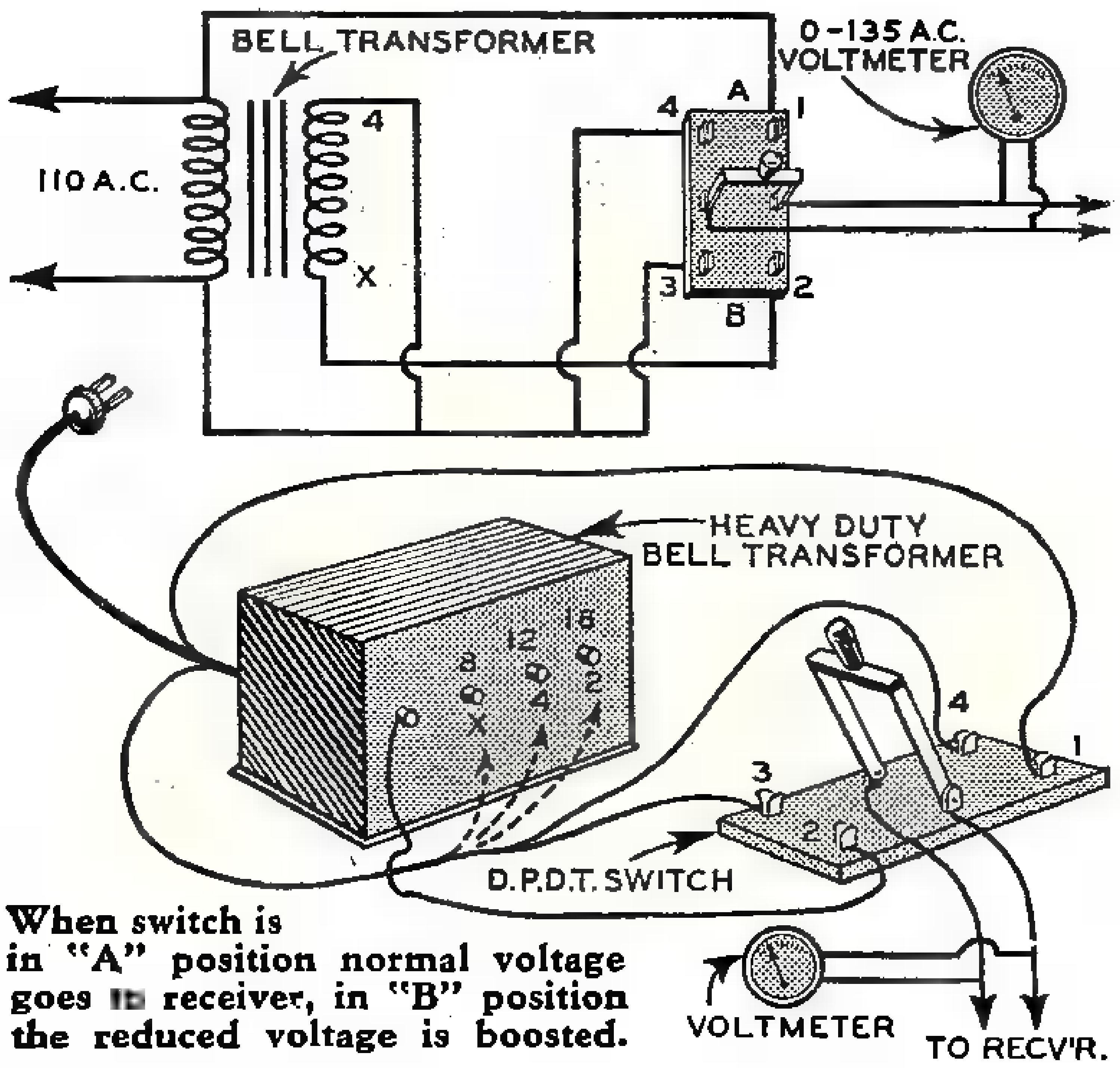
Connect one binding post of the variometer to the antenna post of the receiver. The other is left unconnected. By turning the rotor a point will be found where the inductance and capacity of the variometer will bring the signals in at peak volume.


VARIOMETER
BINDING POST OPEN
ANT. TUNING CONDENSER
VARIOMETER
ANT. POST ON RECEIVER
RECEIVER
ANTENNA TUNING CONDENSER

Variometer is hooked to the portable short wave receiver as illustrated here.

With some receivers, connecting a small variable condenser in series with the wire to the variometer will be found advantageous, but ordinarily just the variometer alone will do nicely. The complete wiring diagram may be seen in the drawing above.

Bell Transformer Boosts A. C. Voltage When It Falls Below 110 Volts


BELL TRANSFORMER
0-135 A.C. VOLTMETER
110 A.C.
4
X
A
1
3
B
2
HEAVY DUTY BELL TRANSFORMER
8
12
18
D.P.D.T. SWITCH
VOLTMETER
TO RECV'R.

When switch is in "A" position normal voltage goes to receiver, in "B" position the reduced voltage is boosted.

MANY districts are troubled with a low voltage in the AC mains when the night load is placed on. A simple way to boost up the voltage is to insert a small transformer in the line, its added output then bringing up the voltage to par. Here is the way to do it.

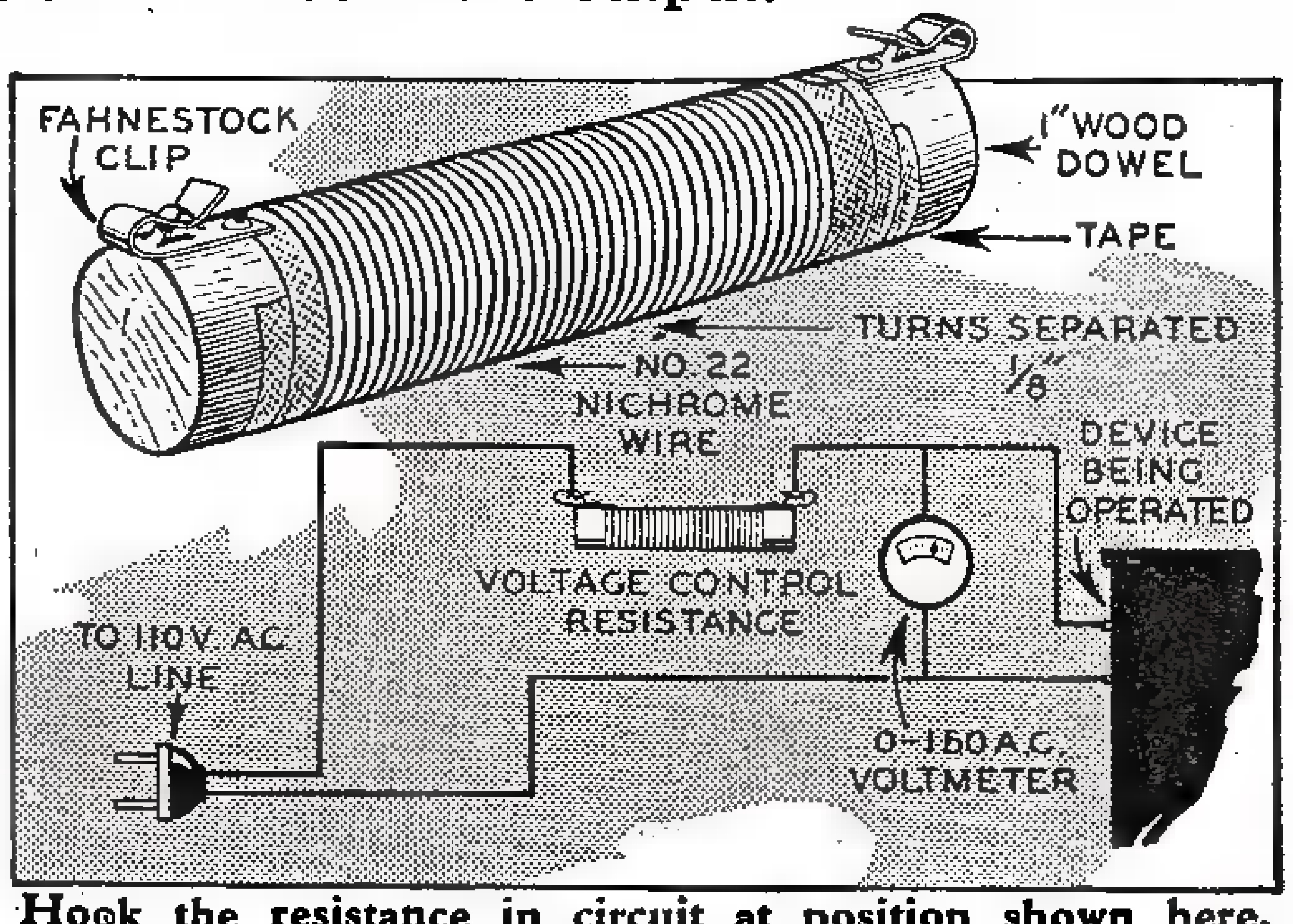
Get a heavy duty bell ringing transformer with taps reading 8, 12 and 18 volts. First tap into the 110 volt cable and lead two wires from it to points 1 and 3 on the D.P.D.T. switch. Also connect two wires to the lead going to point 3 and connect one to point 4. The other should be fitted with a spring clip. This clip then connects to either the 8, 12 or 18 volt tap on the transformer secondary.

Throw switch to A and read the voltage. If low then throw to B and the voltage will be boosted according to which tap the clip is attached.

Connect the switch arm to the receiver input with an 0-135 A. C. voltmeter shunted across the wires. The transformer should be of 75-100 watts output.

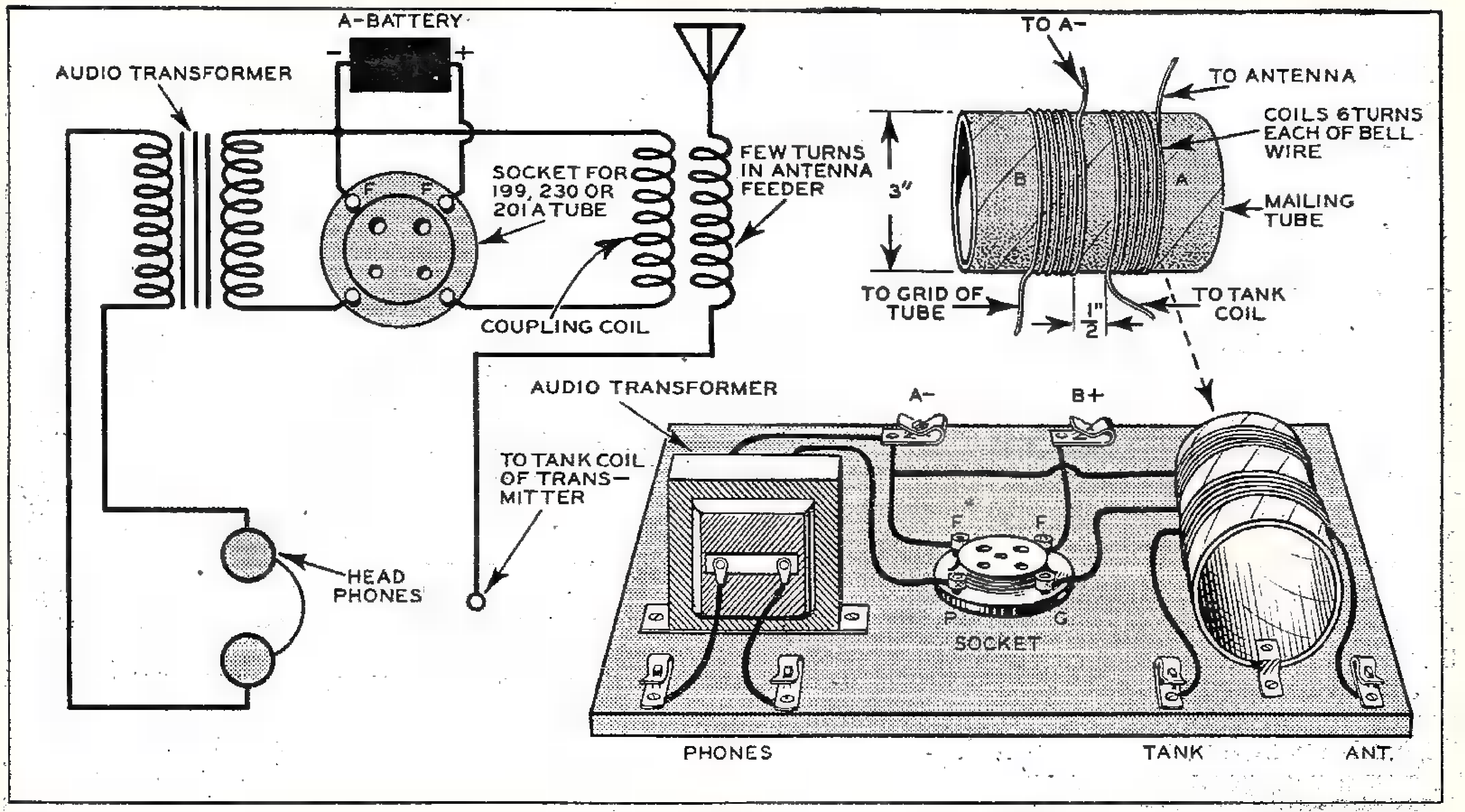
Making a Voltage Line Control

ON NEIGHBORHOOD circuits where the A. C. voltage has a habit of rising above the usual 110, radio receivers need a special voltage control. Such a little gadget may be made by following the drawing at the right. Enough No. 22 Nichrome wire is wound on to about half fill the cylinder. This done, test the voltage with the A.C. voltmeter shown above, selecting some time when voltage is highest. Then add or take off turns till the voltage reaches 110. The gadget is hooked into the circuit at the point illustrated in the drawing. This device used in conjunction with the voltage boosting system above should keep the line voltage steady at all times.


FAHNESTOCK CLIP
1" WOOD DOWEL
TAPE
TURNS SEPARATED 1/8"
NO. 22 NICHROME WIRE
DEVICE BEING OPERATED
VOLTAGE CONTROL RESISTANCE
TO 110V. A.C. LINE
0-150 A.C. VOLTMETER

Hook the resistance in circuit at position shown here. When voltage rises the resistance keeps it reduced to 110.

Simple Antenna Monitoring Unit for S. W. Transmitters


A-BATTERY
AUDIO TRANSFORMER
F F
SOCKET FOR 199, 230 OR 201A TUBE
FEW TURNS IN ANTENNA FEEDER
COUPLING COIL
HEAD PHONES
TO TANK COIL OF TRANSMITTER
AUDIO TRANSFORMER
TO A–
TO ANTENNA
COILS 6 TURNS EACH OF BELL WIRE
MAILING TUBE
3"
B
A
TO GRID OF TUBE
1/2"
TO TANK COIL
A–
B+
F F
P G
SOCKET
PHONES
TANK
ANT.

When hooked in the antenna circuit as illustrated in the wiring diagram above, this monitor will tell you precisely the quality of the voice output. The two Fahnestock clips on the rear of the board lead to A minus and A plus of battery.

THE amateur using a phone transmitter is constantly reminded by the radio laws and reports from other amateurs that he should monitor his modulation. By using this little gadget an accurate check can be obtained and the voice quality tested at all periods of transmission.

All you need is a good audio transformer of any usual ratio, a four prong socket (UX), a 199, 230 or 201A type tube, an A battery, some bell wire and a large mailing tube. You can use the A battery for the receiver if desired or a 4½ volt C battery can be used to light the 199 or 230 tube by using a suitable resistance.

Cut the mailing tube to a length of about 4 inches. Then make two windings of five or six turns each shown as A and B. The ends can be connected to binding posts or sewn into the cardboard. Space the turns their own diameter. Mount this coil horizontally on the right side of a small baseboard as indicated. The proper connections are shown in detail also. "A" goes to the antenna circuit and "B" to the grid circuit of tube. Six Fahnestock clips are fastened to the board as shown, as is the socket and the transformer.

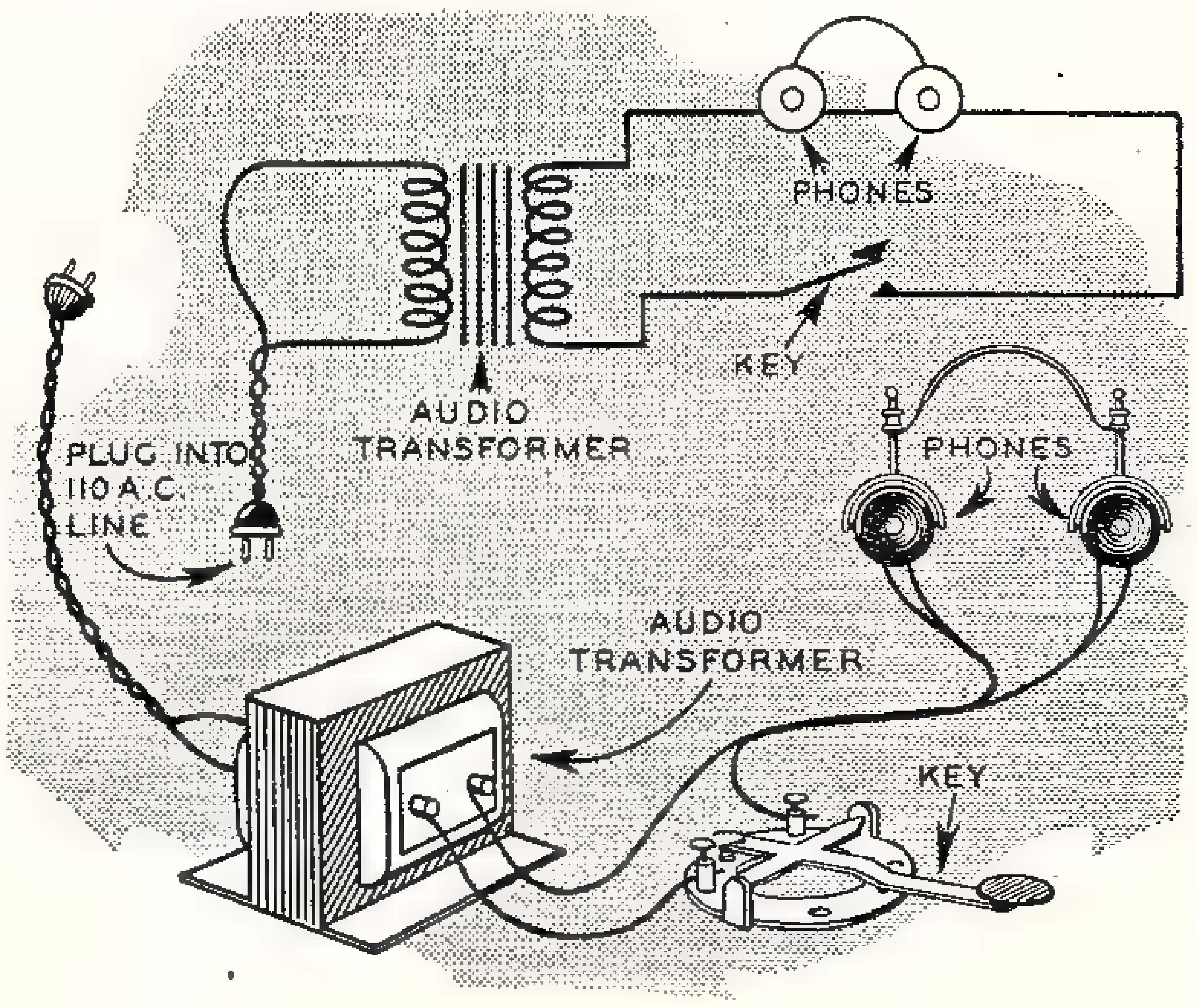
As shown, coil A is merely connected in series with the antenna feeder. With the tube lighted and the transmitter operating, the modulated voice is inductively picked up by coil B through coil A. This swings the grid of the monitor tube which of course controls the plate current accordingly.

The result is heard in the phones and the quality thus checked. The volume is excellent and gives as good or better check than the use of a regulation monitor, and the antenna loss is negligible.

Code Practice Set Has A. C. Note

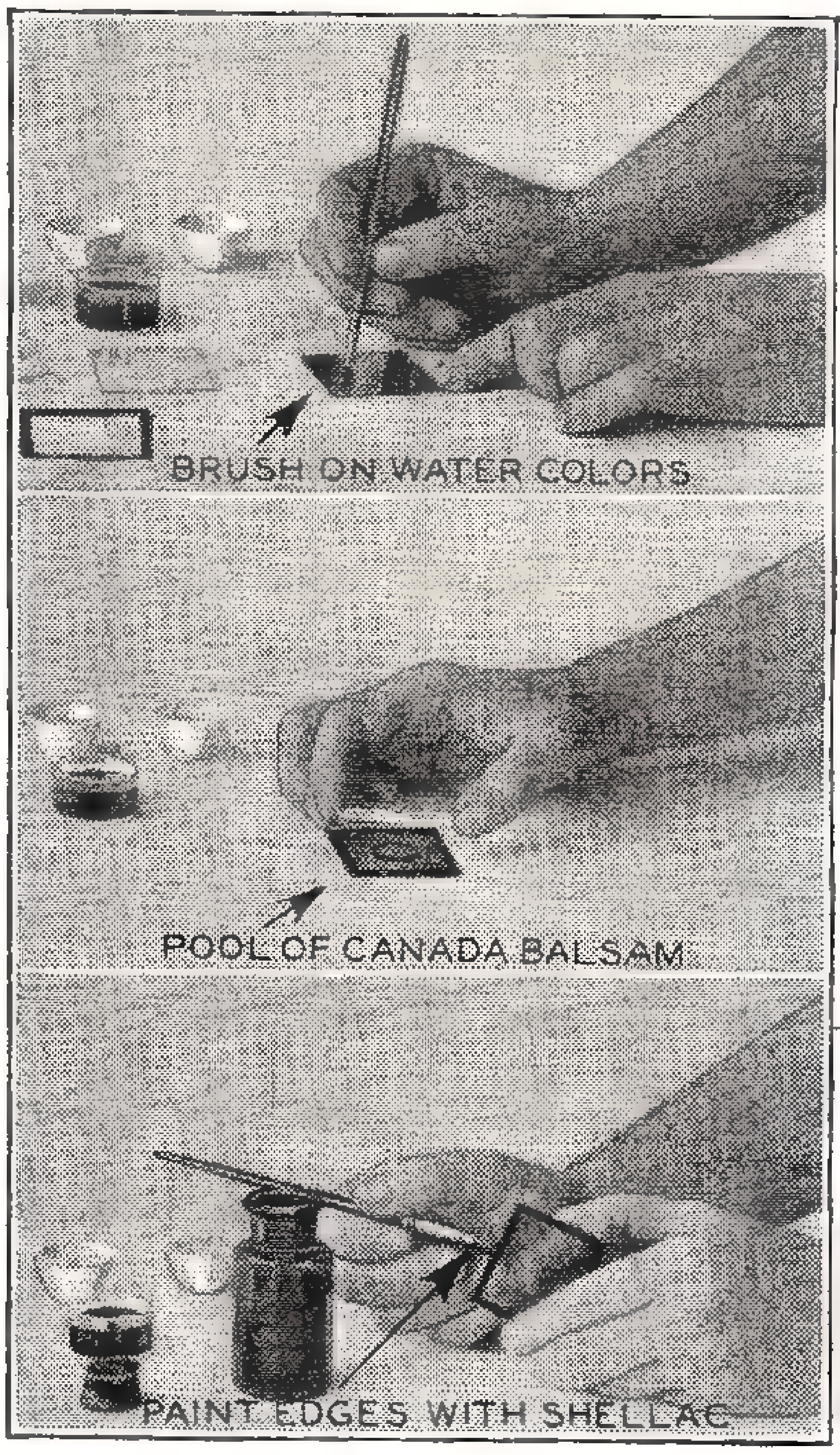
A QUICK hookup for practicing the code can be made as shown in the sketch below. All that is required is an audio transformer, a cord and plug, pair of headphones, a key and some wire.

Connect the cord and plug to the primary of the transformer and plug into the A.C. line. The phones and the key are then connected in series, as shown, with the transformer secondary. Pressing the key will impress an alternating current in the phones. While this note is not ideal for code work, it will do well in a pinch and code practice can be carried on. If the phones cannot stand the current, then put a small watt electric light bulb in the primary.

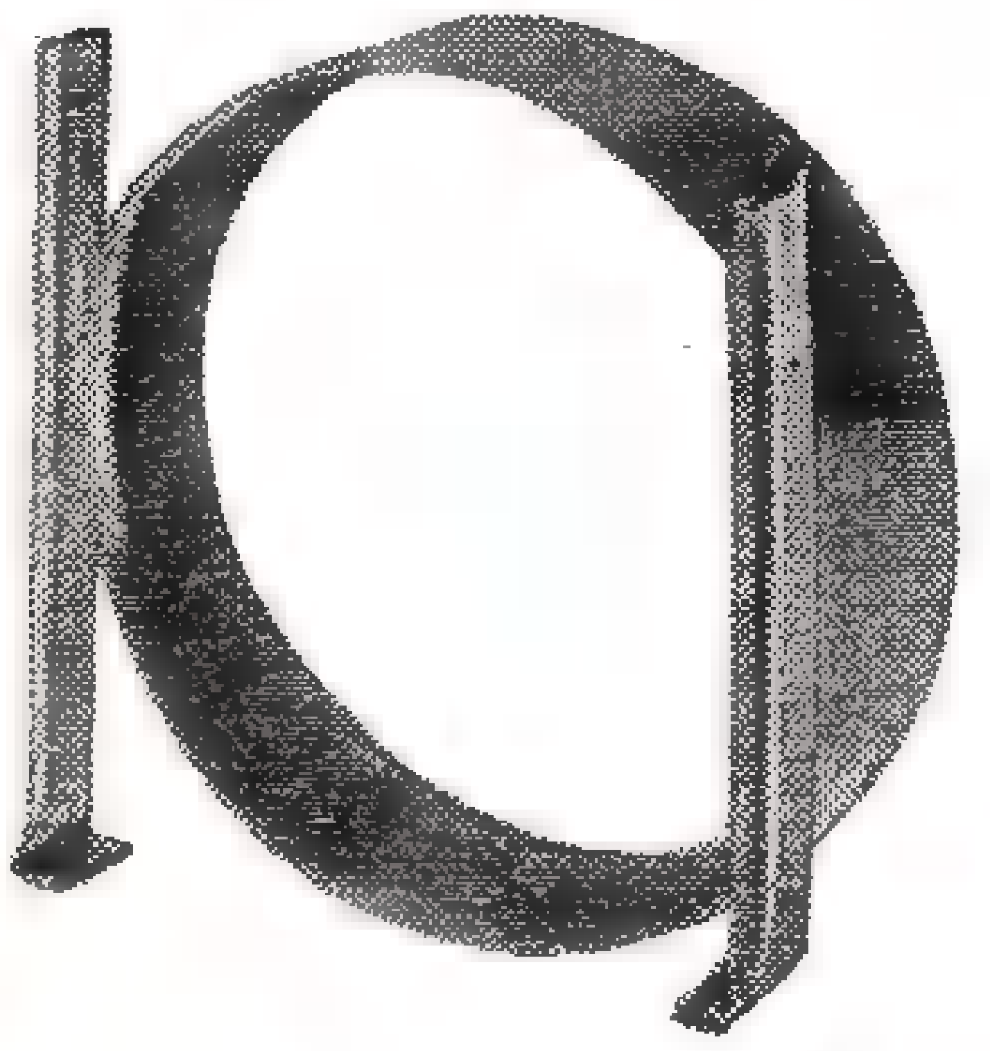

PHONES
KEY
AUDIO TRANSFORMER
PLUG INTO 110 A.C. LINE
PHONES
AUDIO TRANSFORMER
KEY

For code practice the phones and key are hooked in series across the low voltage, or secondary, of the transformer.

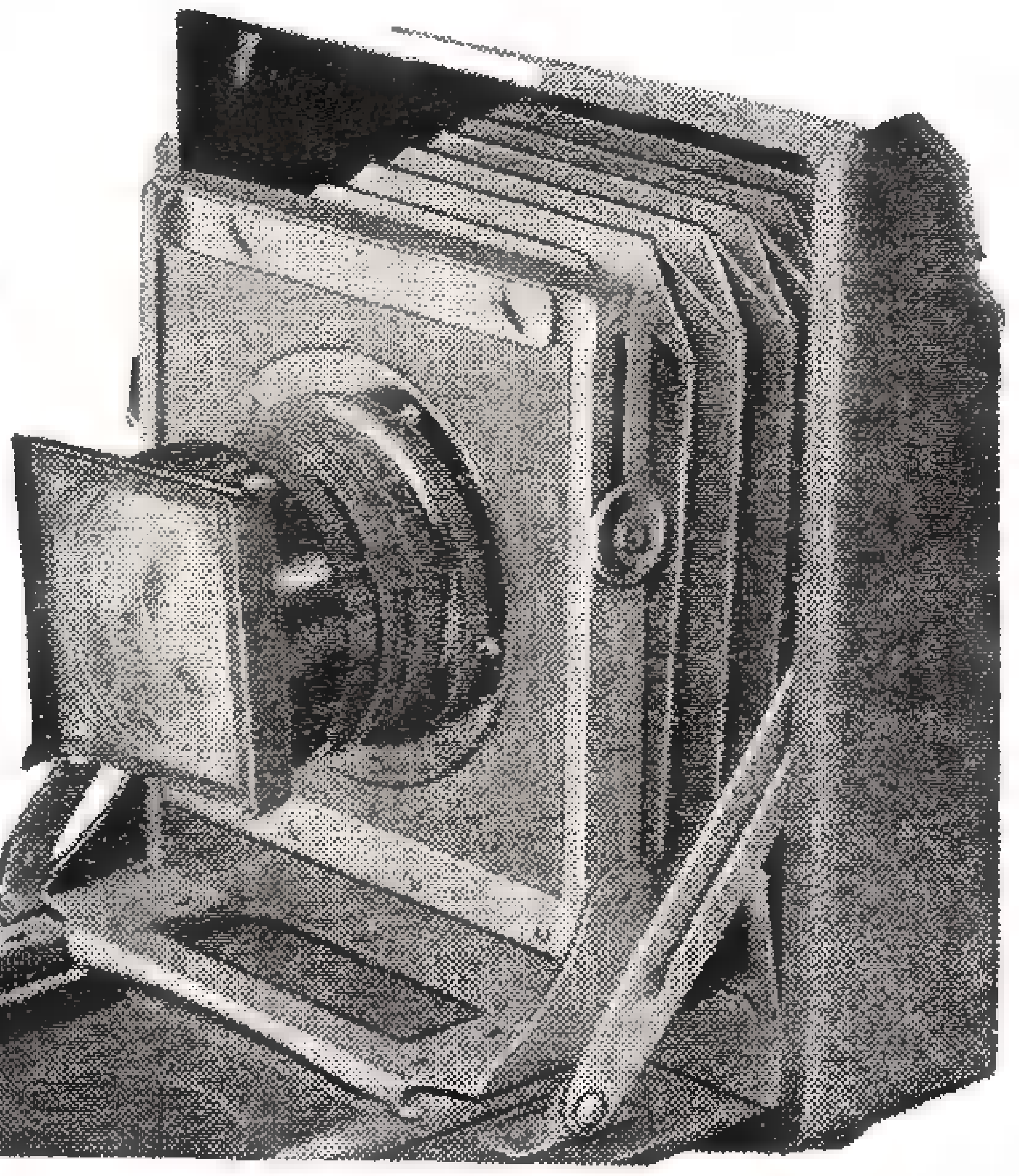
Making Color Filters for Your Camera



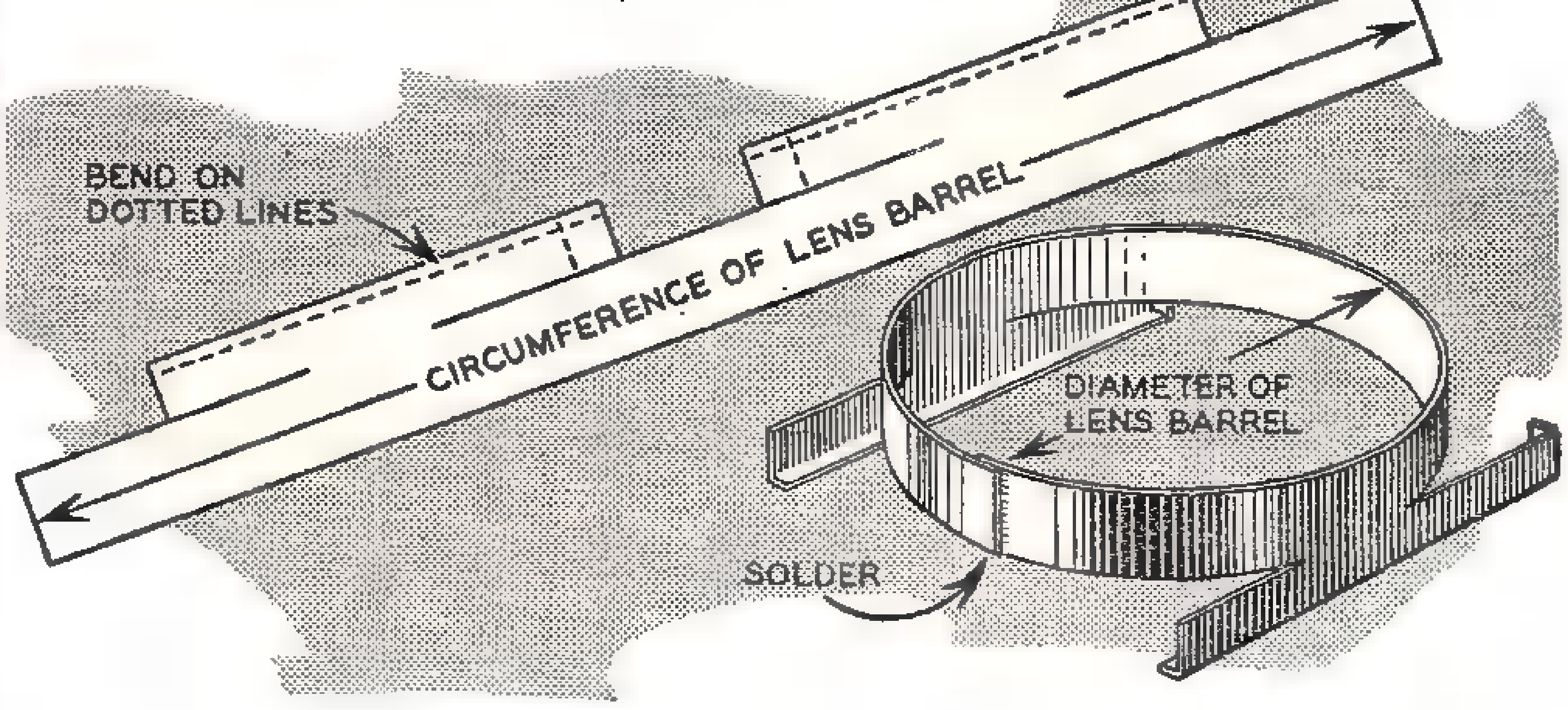
Three chief steps in preparing the filter are illustrated above. Construction of the holder is seen at the right. In cutting out the metal allow extra length for overlapping edge which is soldered. It's advisable to make a pattern first so that a snug fit over the barrel is secured in the finished article.



The completed holder. The filter slides down the groove in the uprights' section.



Here is the color filter fitted in place ready for making a photo.



A GOOD many photographers fail to realize the importance of color filters or screens. While the best ones are factory made, it is possible to produce very good ones at home at a surprisingly small cost.

Several lantern-slide plates should be soaked in a hypo solution in the dark to remove all of the silver from the emulsion. Dry these, being careful to leave the coating of gelatin unharmed. Lay the dry plates, emulsion side down, on a flat surface and cut up into squares having a diameter the same as your camera lens barrel.

Then remove the emulsion from some other lantern-slides with boiling water and cut up into squares the same size as the others.

The pigments used are photo water colors mixed with a small amount of water. Soak an emulsion-covered square in water for a few seconds, remove and drain. Lay flat on the table and brush the color across with a soft brush (see top left photo above). Rotate the square and brush across the former brush marks. Continue in this manner until an even distribution of color has been obtained. Place the square thus prepared in a dust-free place and allow to dry in a level position.

With a razor blade cut some ⅛" wide borders of black paper, the outside sizes of which are the same as the squares. Now place a border upon a dry, colored square and drop a small amount of Canada balsam in the center. A clean cover glass is now carefully placed over this and gently pressed down so as to cause the balsam to flow outward and fill the entire space between the glasses (see center left photo above). Excess balsam may be removed with xylol. Care should be taken to avoid bubbles.

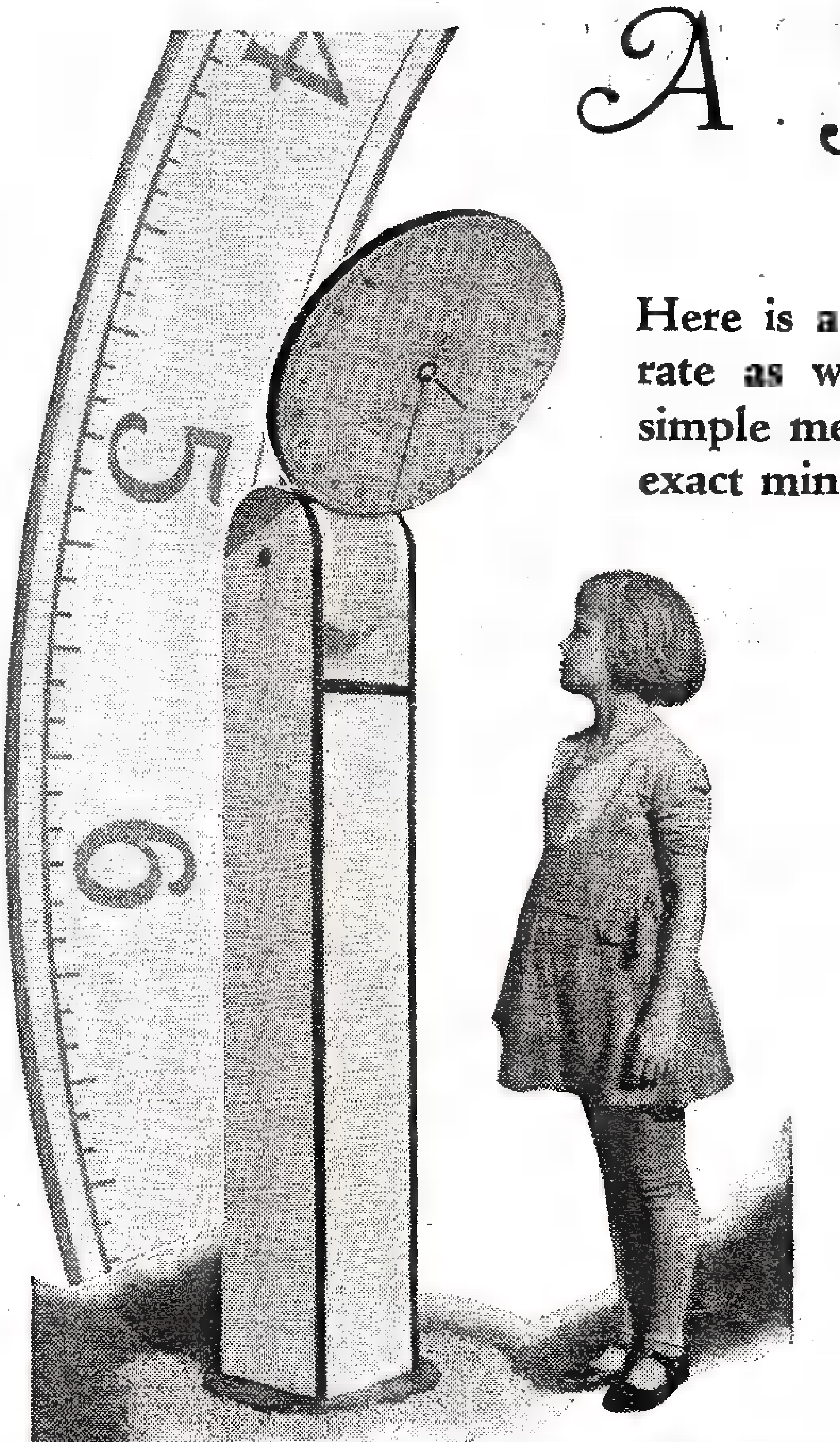
Now lay the filters away in a warm place to harden for several days. At the end of this time paint their edges with shellac or lacquer as demonstrated in the lower left photo. They are now ready for use.

To make a holder draw the pattern shown in the above drawing. Cut it first from paper and try over the lens, then cut it from tin. Cut along the heavy lines and bend into the shape shown. Bend also along the dotted lines. Solder the ends together. Stick a strip of black velvet around inside the ring with balsam, and lacquer the rest black. Accompanying photos show the filter in the holder slipped over the lens. The holder should be just large enough to fit snugly. Use colors as follows: Red for copying blueprints, general contrast; deep yellow, sunsets, clouds, interiors; lemon yellow, general use, clouds, seascapes, landscapes, cutting out blue haze.

A SUN DIAL

by PAUL R. RANNIE

Here is a universal sundial that's extremely accurate as well as highly ornamental. With a few simple mechanical adjustments, it tells time to the exact minute and date both in winter and summer.



A general view of the sundial. The time is about 1:10 p.m. The lower side of the dial is read in winter, as above.

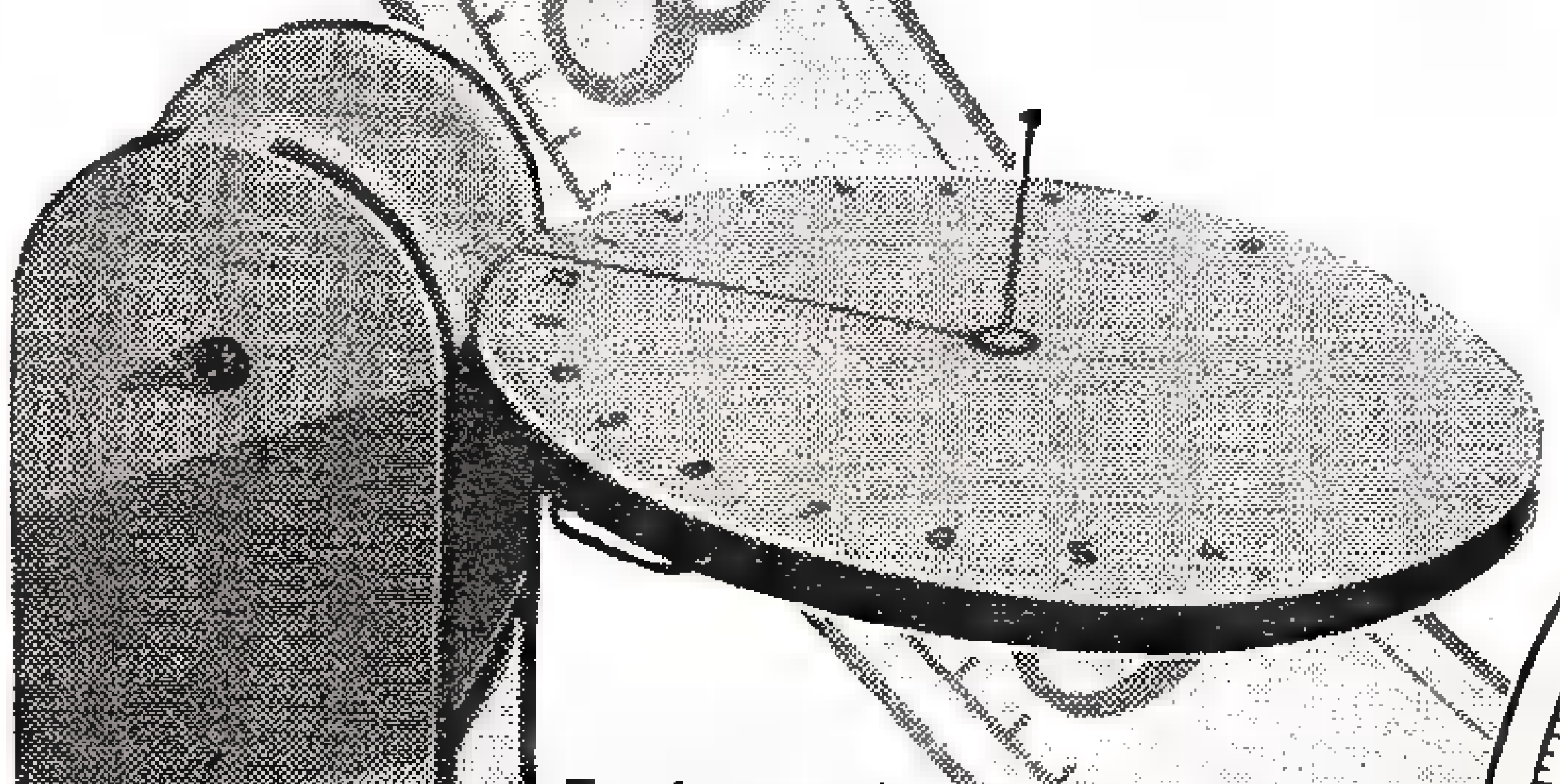
IN ADDITION to showing the time of day within a minute or less of the actual time, this sundial has other interesting features. Namely, it indicates the approximate date during a greater part of the year. And it can be used in all seasons because the lower side, which is protected from the ice and snow, is read in the winter.

The sundial as here shown may be termed a universal dial because it can be used any place on earth, the only adjustment required being the angle of the dial surface.

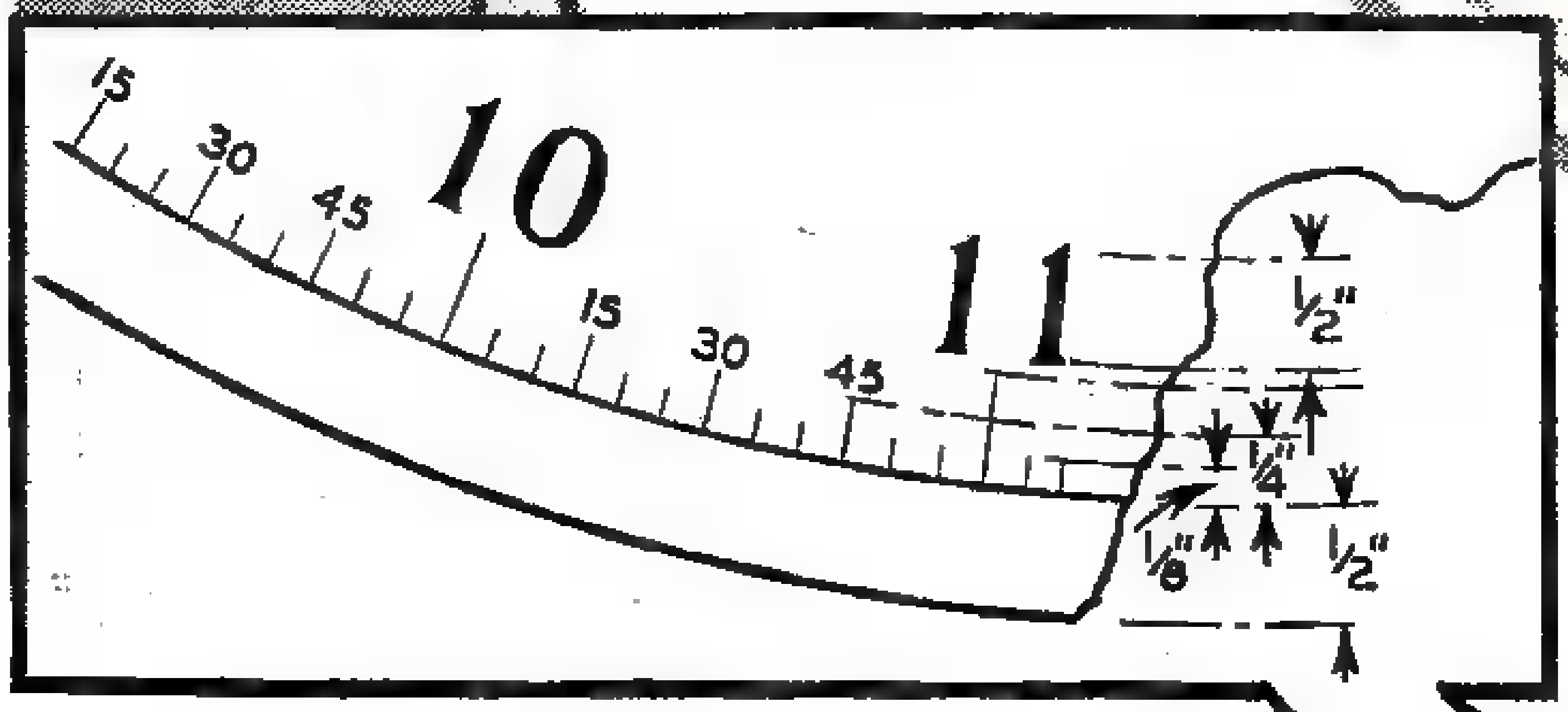
Has Adjustments to Correct Time

The sundial is always accurate because it has an adjustment which corrects for what is called the "Equation of Time." The "Equation of Time" is the difference in time between "mean solar time" (which our clocks indicate) and "apparent solar time" (which the sundial indicates). Ordinary dials are at certain times as much as 16 minutes off.

The accompanying drawings and photographs show the principal features of construction. The foundation upon which the sundial is mounted is simply a platform of rough boards about 20" square and fastened securely at each corner to a 2x4 stake. Be sure that it is perfectly level. Make the hole



Further north dial is stationed, the lower it is tipped. Here is the North pole adjustment.


15
30
45
10
15
30
45
11
1/2"
1/4"
1/8"
1/2"

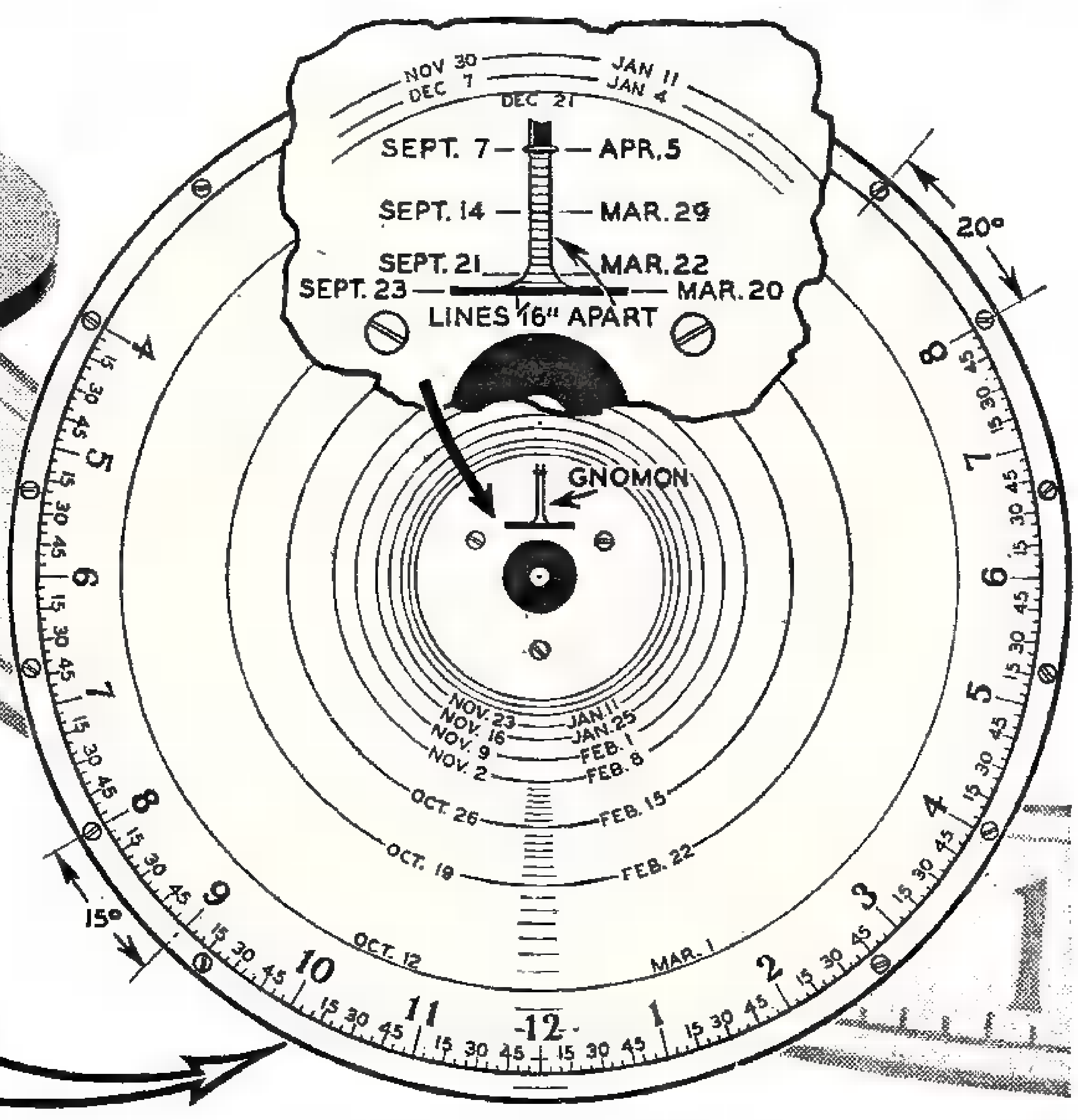

NOV 30
DEC 7
DEC 21
JAN 11
JAN 4
SEPT. 7
APR. 5
SEPT. 14
MAR. 29
SEPT. 21
MAR. 22
SEPT. 23
MAR. 20
LINES 1/16" APART
20°
GNOMON
NOV. 23
NOV. 16
NOV. 9
NOV. 2
JAN 11
JAN 25
FEB. 1
FEB. 8
OCT. 26
FEB. 15
OCT. 19
FEB. 22
OCT. 12
MAR. 1
15°
4
5
6
7
8
9
10
11
12
1
2
3
4
5
6
7
8
15 30 45

Fig. 1. How figures are laid out. At right is layout of south side of the dial.

that's DIFFERENT

in the ground larger than the platform and fill below and around the edges with gravel as illustrated in Fig. 6. Use screws to fasten the platform to the stakes and throughout the sundial if possible.

The circular base, which is made of two layers of 1" boards nailed together, is mounted so it may be rotated on the square platform. It is clamped in position by four wooden blocks which grip its beveled edge. A large nail or screw may be placed in the center of the base to aid in making it rotate freely.

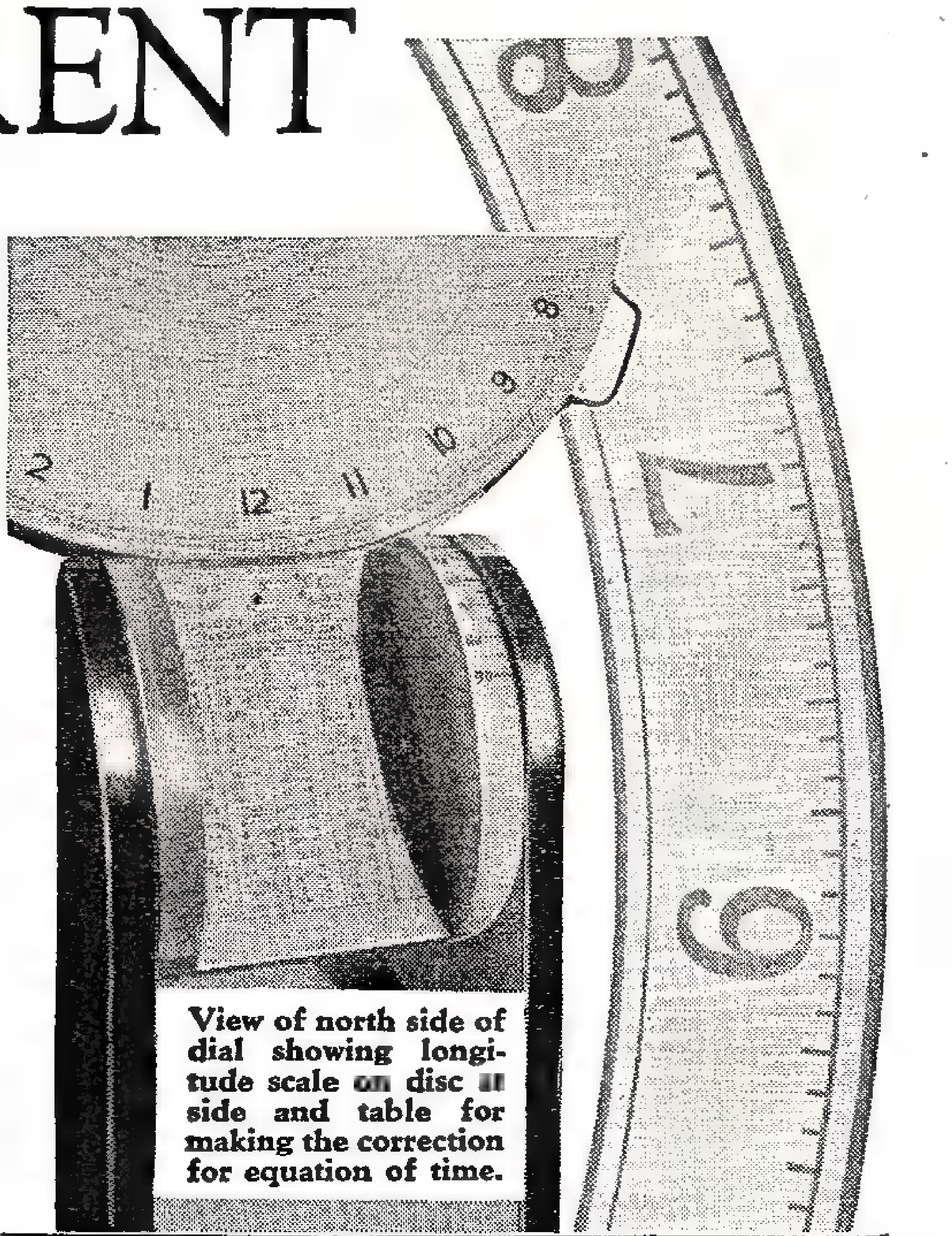
Two square blocks the size of the inside of the square column are nailed to the center of the circular base. The square column slips over these blocks and is fastened with screws.

Dial Is on Duty in All Weather

The square column and also all the other parts of the sundial should be made of well seasoned material and the boards painted on all sides before assembling to insure against warping. (See Fig. 6.)

The support for the dial proper is made from a 12" board. A 3" hole, which is the bearing for shifting the dial, is cut in the center near one end and the 7½" arcs, as shown on the drawing, are cut in order that it may fit inside the dial rim. The other end is cut down to 5" and the two 8" circular side pieces are mounted as shown. These 8" circular pieces are clamped tightly between the rounded ends of the extended sides of the square column by means of two 2¾" wood screws. These wood screws also act as bearings.

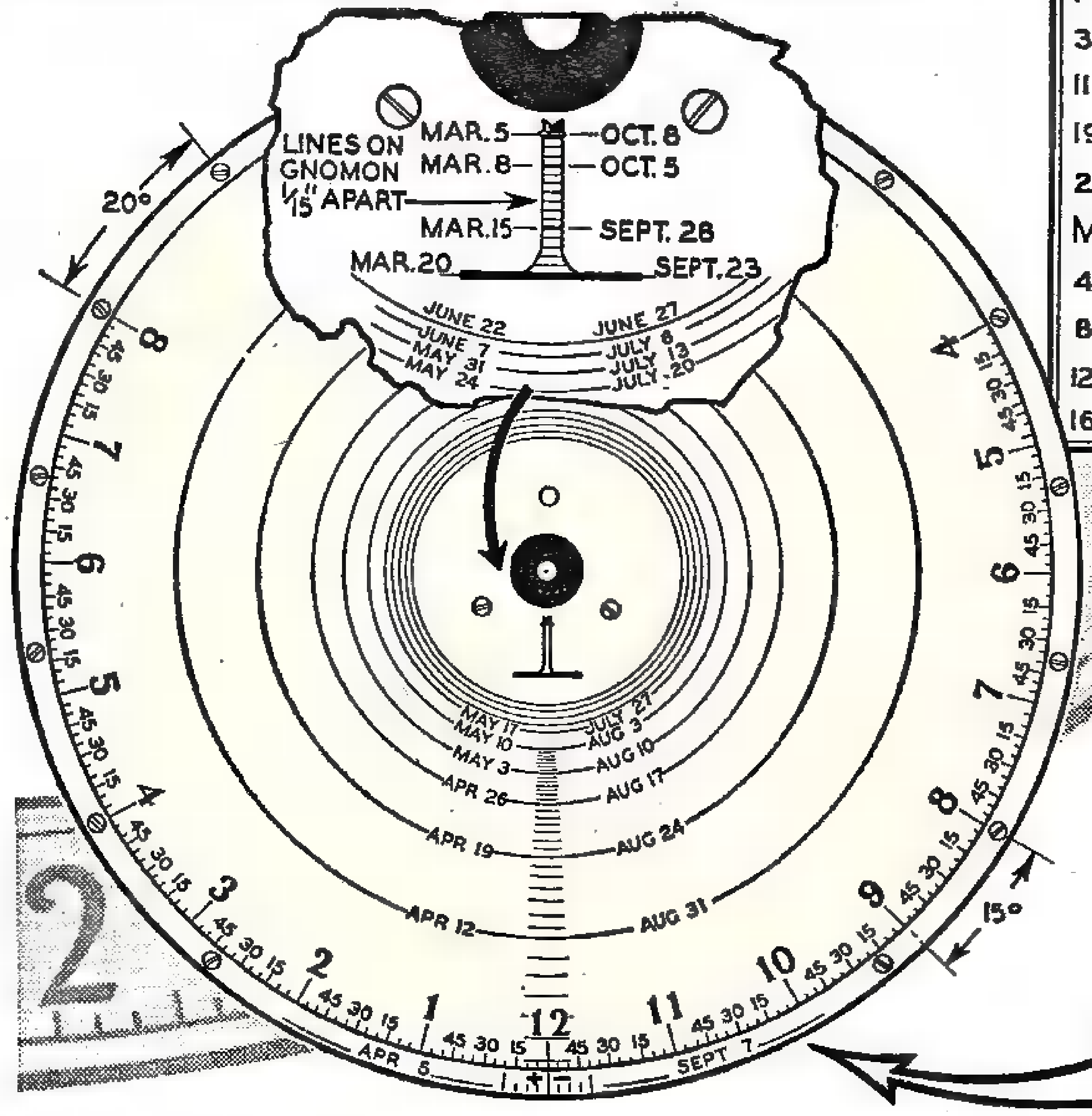
The dial surfaces are made, preferably, of "press-wood" although plywood will suffice. The dials are held together at the center by a circular piece of wood, approxi-


8
9
10
11
12
1
2
7
6

View of north side of dial showing longitude scale on disc at side and table for making the correction for equation of time.

TABLE FOR EQUATION OF TIME CORRECTION									
JAN.		20	+8	15	0	13	−4	DEC.	
2	+4	23	+7	20	+1	16	−5	2	−11
4	+5	26	+6	24	+2	19	−6	4	−10
6	+6	29	+5	29	+3	22	−7	6	−9
9	+7	APR.		JULY		25	−8	9	−8
11	+8	1	+4	4	+4	28	−9	11	−7
14	+9	5	+3	10	+5	OCT.		13	−6
17	+10	8	+2	19	+6	1	−10	15	−5
20	+11	12	+1	27	+6	4	−11	17	−4
24	+12	16	0	AUG.		8	−12	19	−3
28	+13	20	−1	4	+6	11	−13	21	−2
FEB		25	−2	12	+5	15	−14	23	−1
3	+14	MAY		18	+4	20	−15	25	0
11	+14½	2	−3	22	+3	27	−16	27	+1
19	+14	6	−3½	26	+2	NOV.		29	+2
27	+13	16	−4	29	+1	3	−16½	31	+3
MAR		24	−3½	SEPT.		11	−16		
4	+12	29	−3	1	0	17	−15		
8	+11	JUNE		5	−1	22	−14		
12	+10	5	−2	8	−2	26	−13		
16	+9	10	−1	11	−3	29	−12		

Fig. 2. Adjust dial according to above table, which is painted on board between two circular wood pieces beneath dial.


LINES ON GNOMON 1/15" APART
MAR.5 — OCT.8
MAR.8 — OCT.5
MAR.15 — SEPT.28
MAR.20 — SEPT.23
JUNE 22
JUNE 7
MAY 31
MAY 24
JUNE 27
JULY 6
JULY 13
JULY 20
MAY 17
MAY 10
MAY 3
APR 26
APR 19
APR 12
APR 5
JULY 27
AUG 3
AUG 10
AUG 17
AUG 24
AUG 31
SEPT 7
20°
15°
8
7
6
5
4
3
2
1
12
11
10
9
8
7
6
5
4
45 30 15

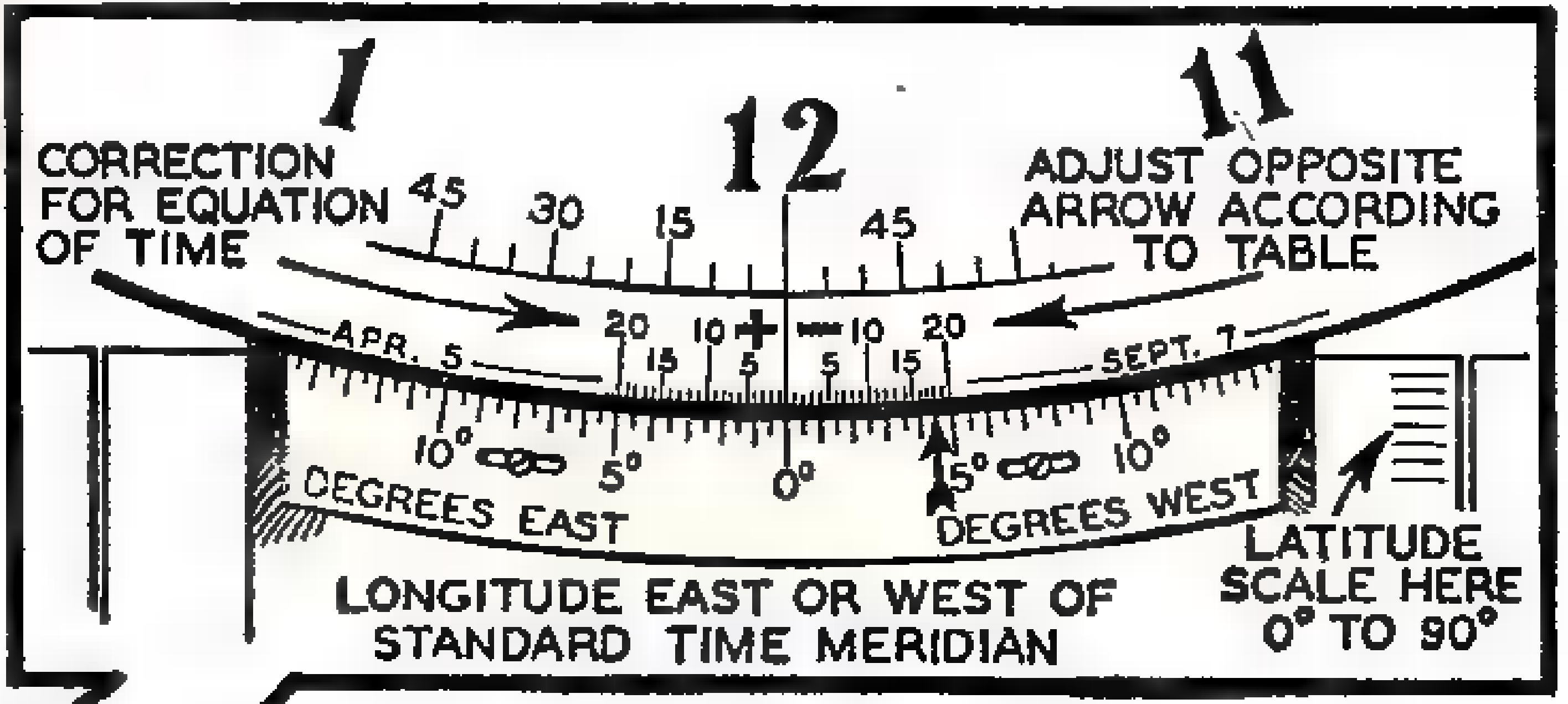

1
12
11
CORRECTION FOR EQUATION OF TIME
45
30
15
45
ADJUST OPPOSITE ARROW ACCORDING TO TABLE
APR. 5
SEPT. 7
20 10 + 10 20
15 5 5 15
10° 5° 0° 5° 10°
DEGREES EAST
DEGREES WEST
LONGITUDE EAST OR WEST OF STANDARD TIME MERIDIAN
LATITUDE SCALE HERE 0° TO 90°

Fig. 3. North side of the dial. Above is seen scales for adjustment of longitude.

Adjusted for Latitude and Date, Dial Tells Time Accurately as Watch

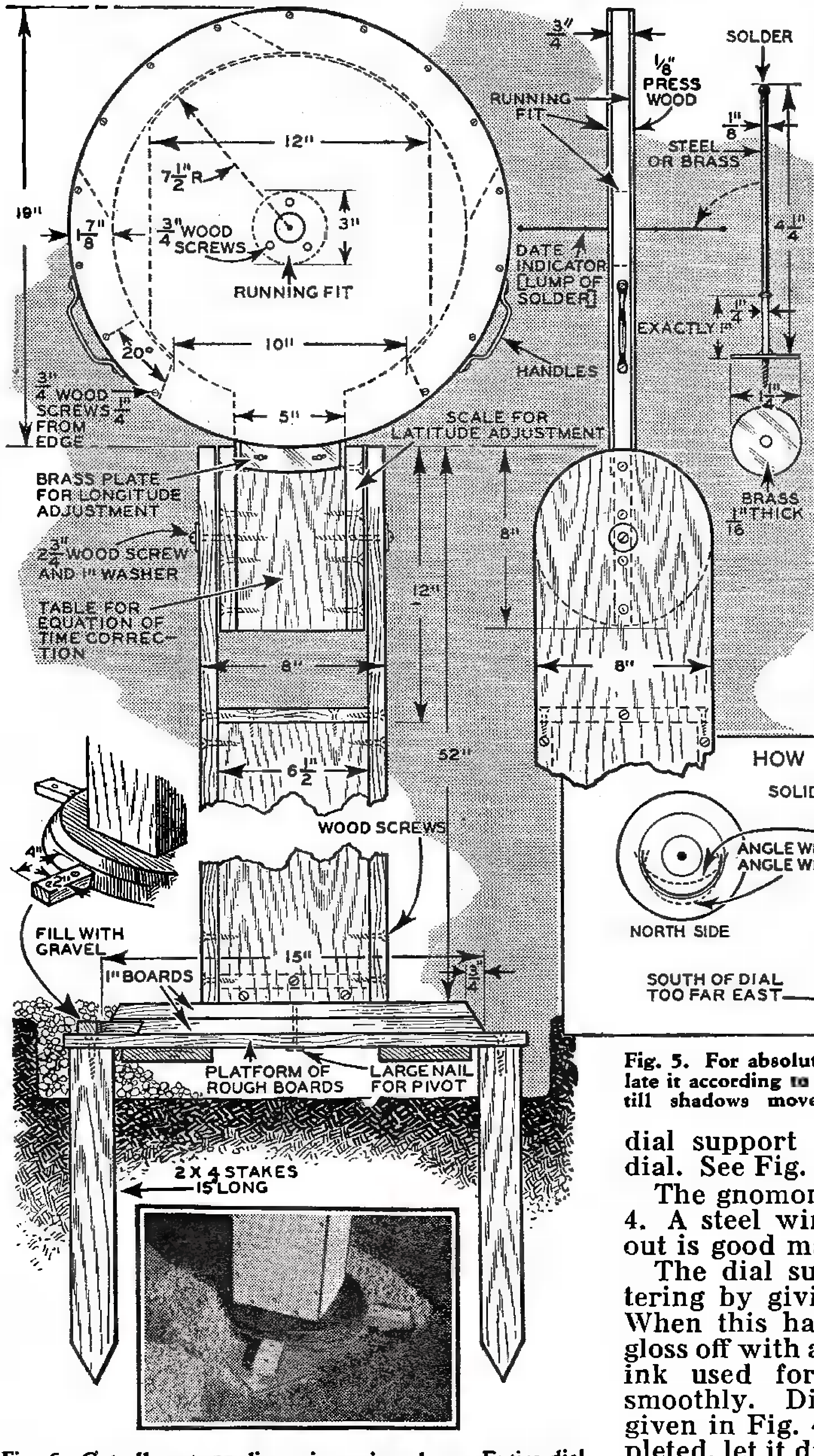

19"
12"
7½"R
3/4" WOOD SCREWS
3"
RUNNING FIT
1 7/8"
20°
10"
3/4 WOOD SCREWS 1/4" FROM EDGE
5"
BRASS PLATE FOR LONGITUDE ADJUSTMENT
2 3/4" WOOD SCREW AND 1" WASHER
TABLE FOR EQUATION OF TIME CORRECTION
8"
6½"
3/4"
RUNNING FIT
1/8" PRESS WOOD
SOLDER
1/8"
STEEL OR BRASS
4 1/4"
DATE INDICATOR [LUMP OF SOLDER]
EXACTLY 1"
1/4"
HANDLES
1/4"
BRASS 1/16" THICK
SCALE FOR LATITUDE ADJUSTMENT
8"
12"
52"
8"
WOOD SCREWS
15"
3/4"
4"
FILL WITH GRAVEL
1" BOARDS
PLATFORM OF ROUGH BOARDS
LARGE NAIL FOR PIVOT
2 X 4 STAKES 15" LONG

Fig. 6. Cut all parts to dimensions given here. Entire dial rests on platform staked into ground. Scale for latitude adjustment begins with zero at top and comes around to 90°.

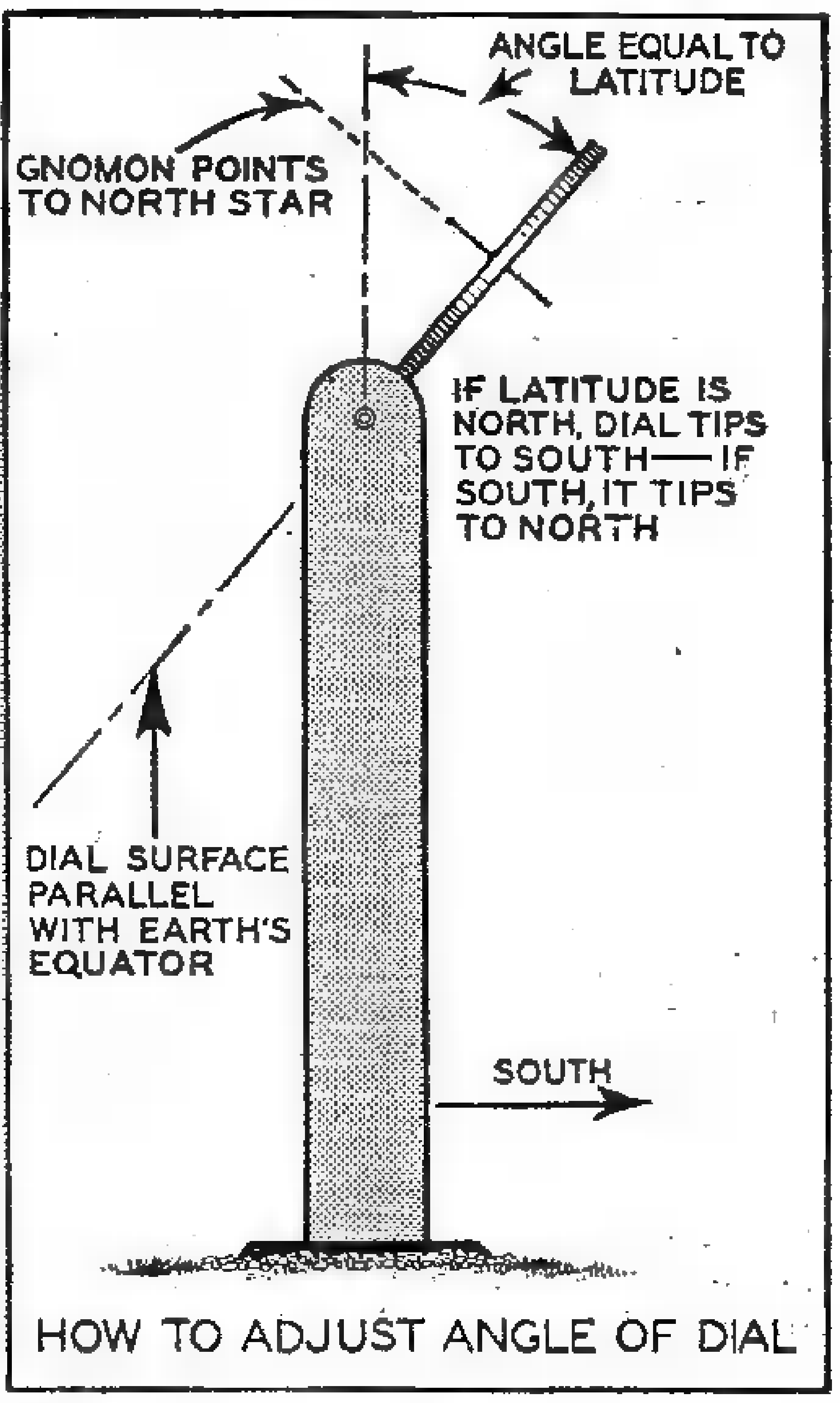

ANGLE EQUAL TO LATITUDE
GNOMON POINTS TO NORTH STAR
IF LATITUDE IS NORTH, DIAL TIPS TO SOUTH— IF SOUTH, IT TIPS TO NORTH
DIAL SURFACE PARALLEL WITH EARTH'S EQUATOR
SOUTH
HOW TO ADJUST ANGLE OF DIAL

Fig. 4. Adjust the dial as indicated above. Determine your latitude and adjust the latitude scale accordingly.

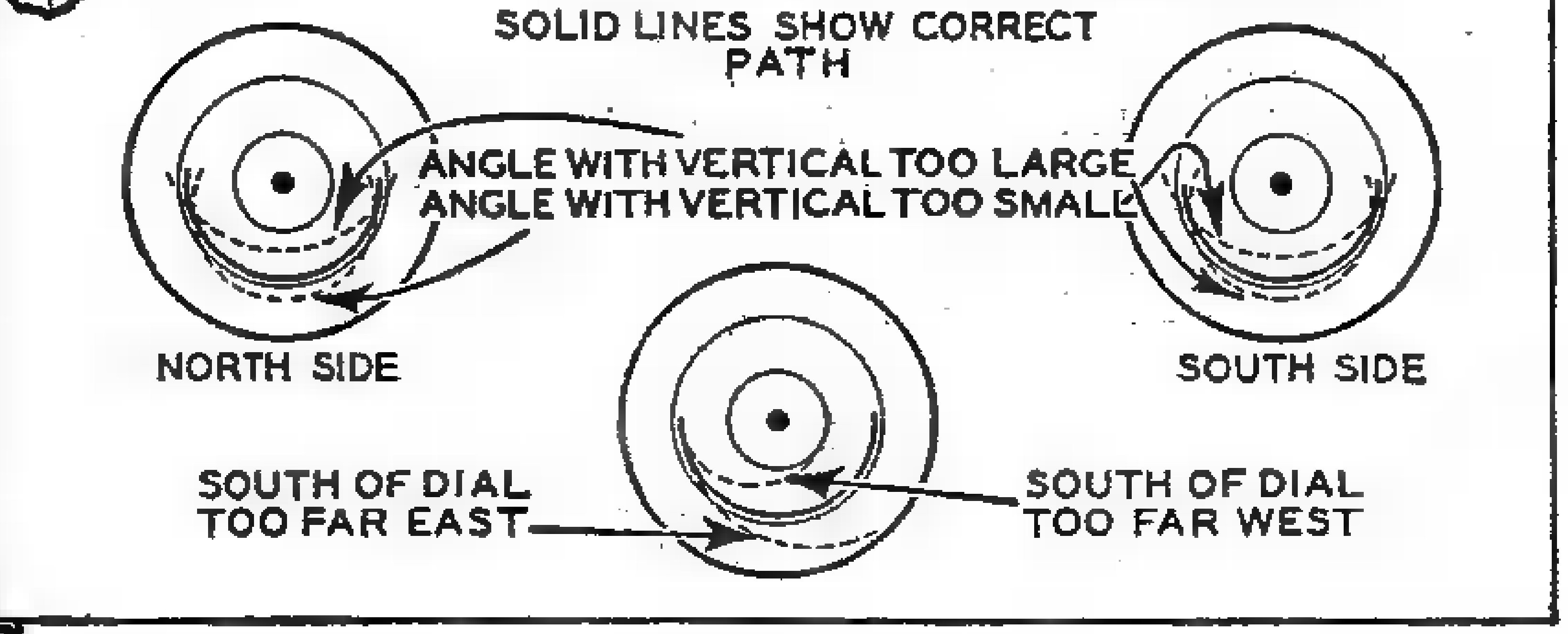

HOW TO CHECK DIAL ADJUSTMENT
SOLID LINES SHOW CORRECT PATH
ANGLE WITH VERTICAL TOO LARGE
ANGLE WITH VERTICAL TOO SMALL
NORTH SIDE
SOUTH SIDE
SOUTH OF DIAL TOO FAR EAST
SOUTH OF DIAL TOO FAR WEST

Fig. 5. For absolute accuracy of time check dial and regulate it according to above drawings. Twist support on base till shadows move in circles indicated by solid line.

mately 3" in diameter, which turns freely in the 3" hole in the dial support.

A wooden rim made up of a number of pieces is secured between the dial surfaces at the outer edges except for the space as shown on the drawing (Fig. 6). The thickness of this wooden rim and also the 3" circular piece should be about the same as that of the board that supports the dials.

A small brass plate, with slots for longitude adjustment, should be mounted on the dial support adjacent to the edge of the dial. See Fig. 3.

The gnomons are made as shown in Fig. 4. A steel wire clothes hook straightened out is good material to use.

The dial surfaces are prepared for lettering by giving a coat of white lacquer. When this has dried thoroughly take the gloss off with an eraser. Otherwise the India ink used for lettering will not spread smoothly. Dimensions for lettering are given in Fig. 4. After the lettering is completed, let it dry thoroughly and give a coat of thin transparent varnish.

The dimensions for the date circles are as follows:

NORTH SIDE OF DIAL

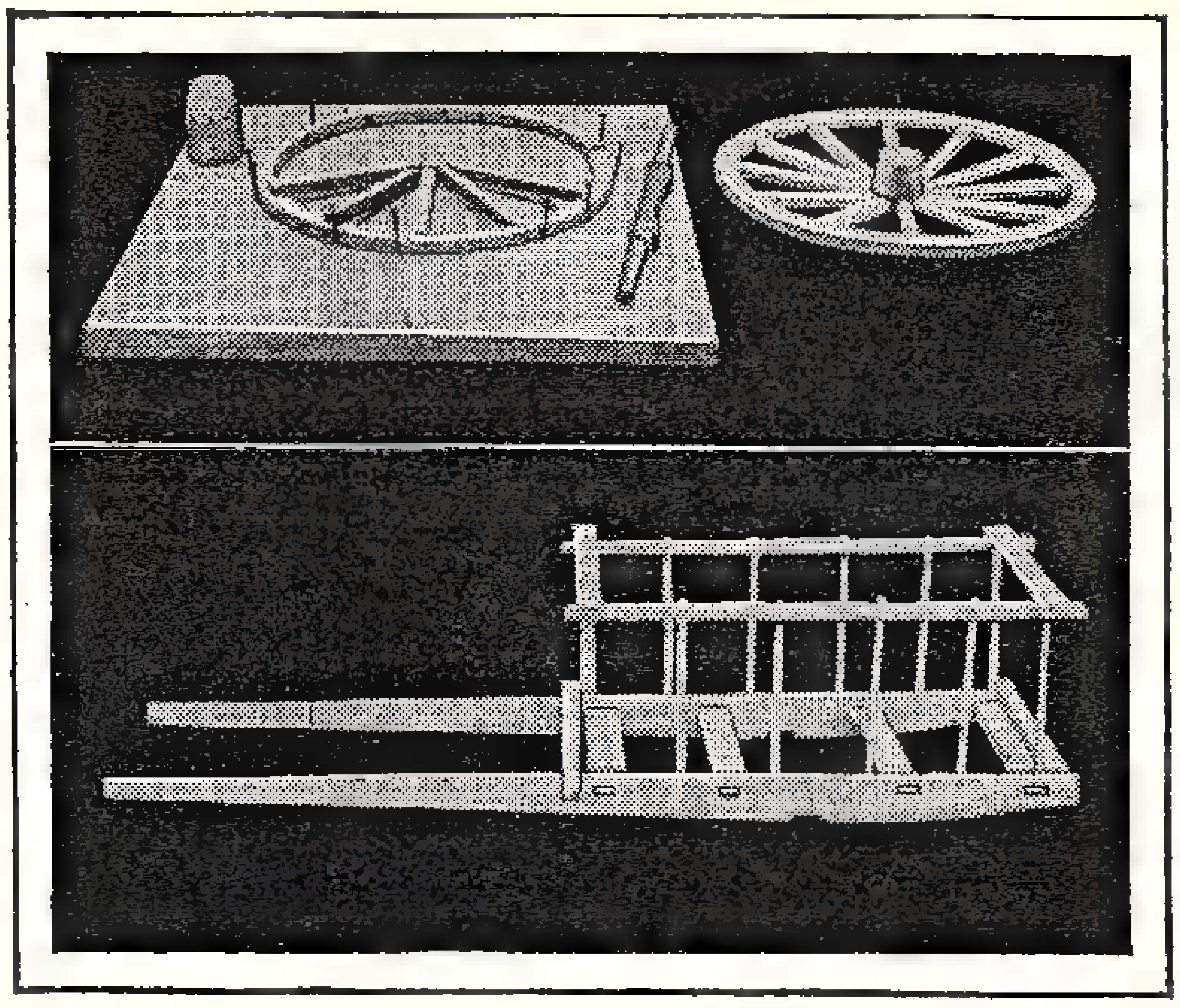
Date Circle	Radius
June 21, June 22	2 5/16"
June 7, July 6	2⅜"
May 31, July 13	2 31/64"
May 24, July 20	2 21/32"
May 17, July 27	2 55/64"
May 10, Aug. 3	3 11/64"
May 3, Aug. 10	3 19/32"
Apr. 26, Aug. 17	4 3/16"
Apr. 19, Aug. 24	5 3/32"
Apr. 12, Aug. 31	6⅝"
Apr. 5, Sept. 7	9 15/32"

SOUTH SIDE OF DIAL

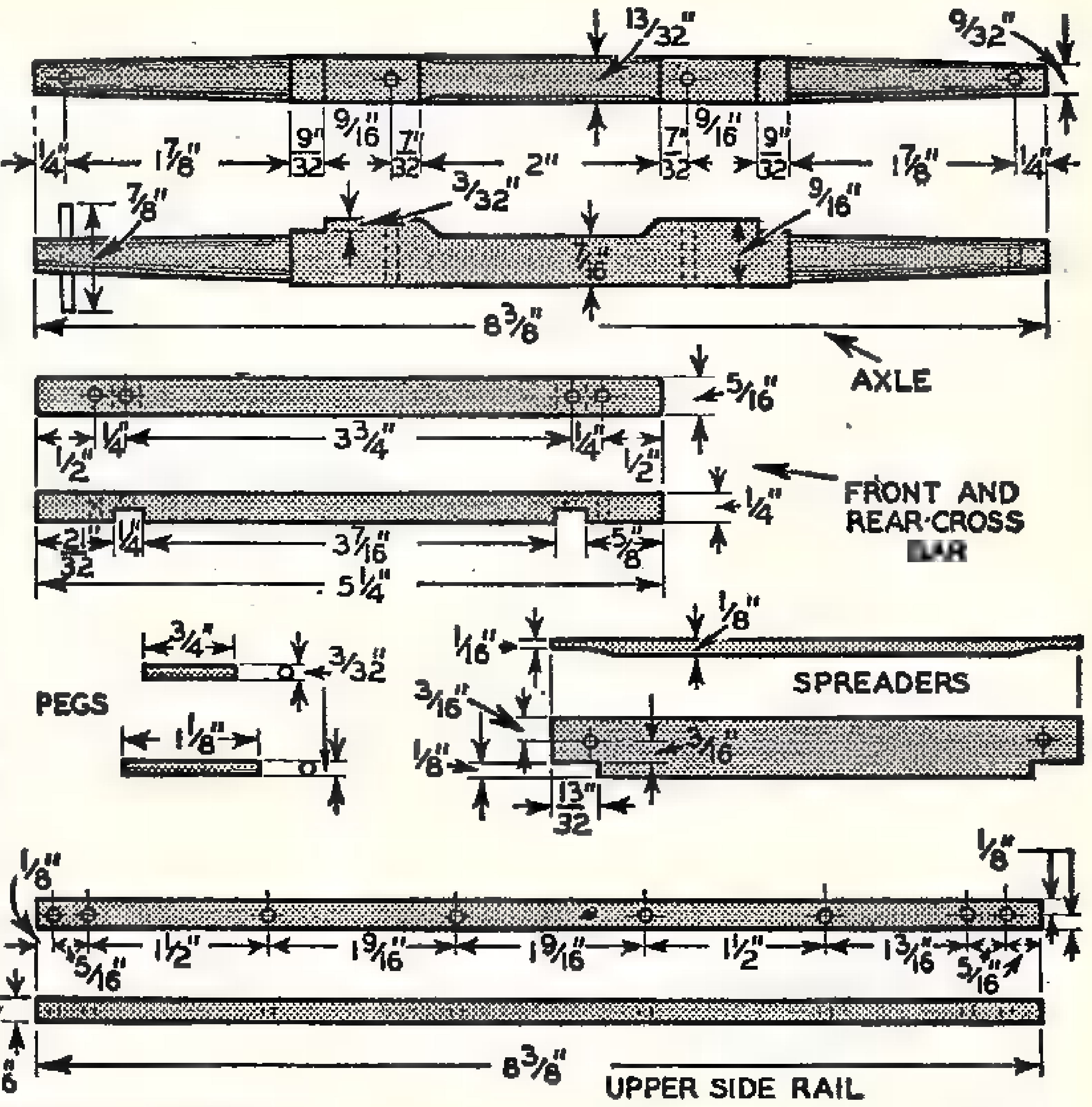
Date Circle	Radius
Dec. 21	2 5/16"
Dec. 7, Jan. 4	2 25/64"
Nov. 30, Jan. 11	2½"
Nov. 23, Jan. 18	2 43/64"
Nov. 16, Jan. 25	2 15/16"
Nov. 9, Feb. 1	3 17/64"
Nov. 2, Feb. 8	3¾"
Oct. 26, Feb. 15	4½"
Oct. 19, Feb. 22	5⅝"
Oct. 12, Mar. 1	7½"

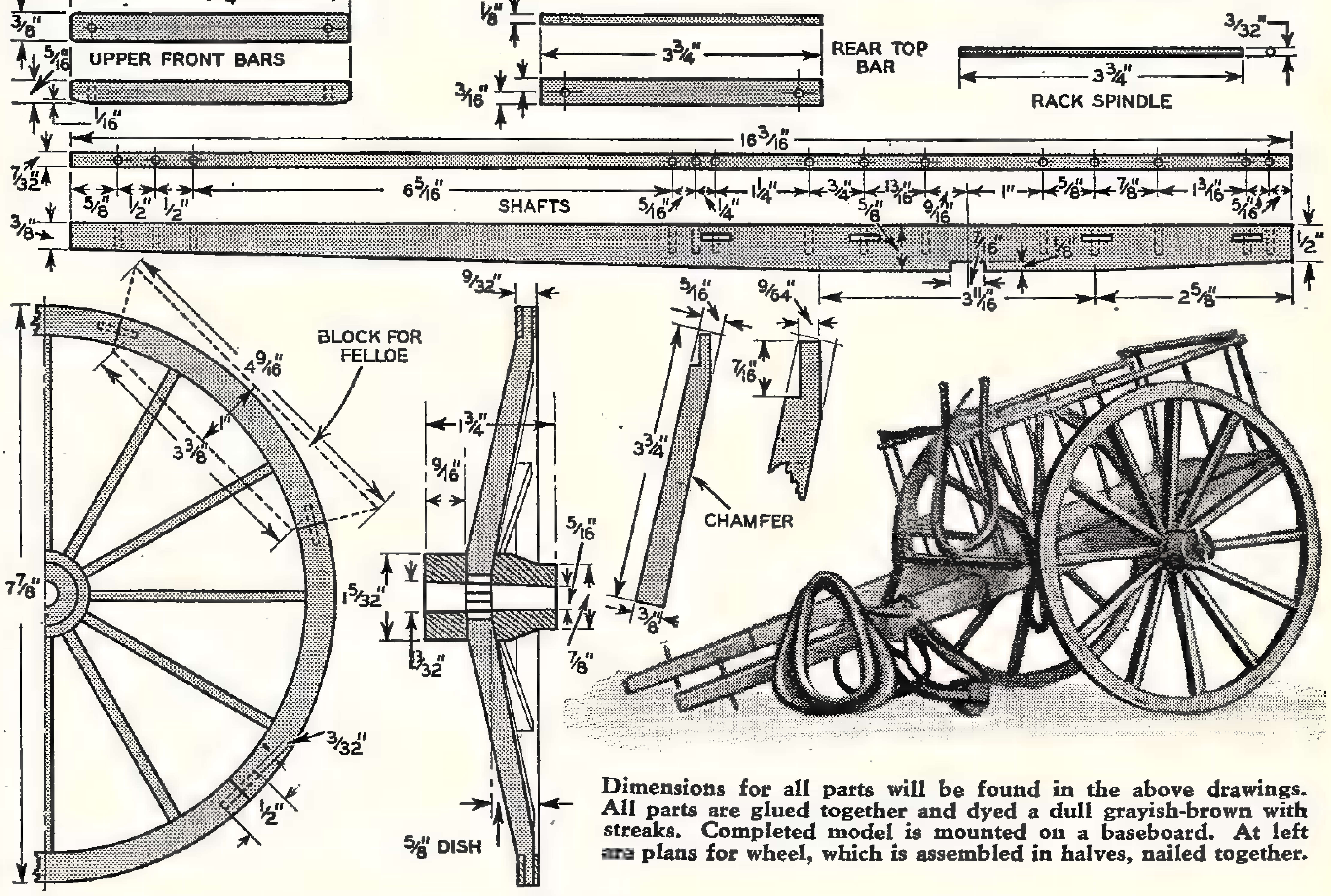
(Continued on page 140)

Model of Historic Red River OX CART



The wheels are assembled in the special assembly board shown here, one-half of the part being made up at a time. Below is seen the body of cart ready for wheels.


13/32"
9/32"
1/4"
1 7/8"
9/32
9/16
7/32
2"
7/32
9/16
9/32
1 7/8"
1/4"
7/8"
3/32"
9/16"
7/16"
8 3/8"
AXLE
5/16"
1/2"
1/4"
3 3/4"
1/4"
1/2"
1/4"
FRONT AND REAR CROSS BAR
21/32
1/4
3 7/16"
5/8"
5 1/4"
3/4"
3/32
PEGS
1 1/8"
1/16"
1/8"
SPREADERS
3/16"
3/16"
1/8"
13/32
1/8"
1/8"
5/16"
1/2"
1 9/16"
1 9/16"
1/2"
1 3/16
5/16"
3/16
8 3/8"
UPPER SIDE RAIL


3 3/4"
3/8"
5/16"
UPPER FRONT BARS
1/16"
1/8"
3 3/4"
3/16"
REAR TOP BAR
3/32"
3 3/4"
RACK SPINDLE
16 3/16
7/32"
5/8"
1/2"
1/2"
6 5/16"
SHAFTS
5/16"
1/4"
1/4"
3/4"
13/16
5/8"
9/16
1"
5/8"
7/8"
1 3/16
5/16"
3/8"
1/2"
7/16
1/8"
3 11/16
2 5/8"
4 9/16"
1"
3 3/8"
BLOCK FOR FELLOE
7 7/8"
3/32"
1/2"
9/32"
1 3/4"
9/16"
5/16"
1 5/32"
13/32"
7/8"
5/8" DISH
5/16"
9/64"
7/16"
3 3/4"
3/8"
CHAMFER

Dimensions for all parts will be found in the above drawings. All parts are glued together and dyed a dull grayish-brown with streaks. Completed model is mounted on a baseboard. At left are plans for wheel, which is assembled in halves, nailed together.

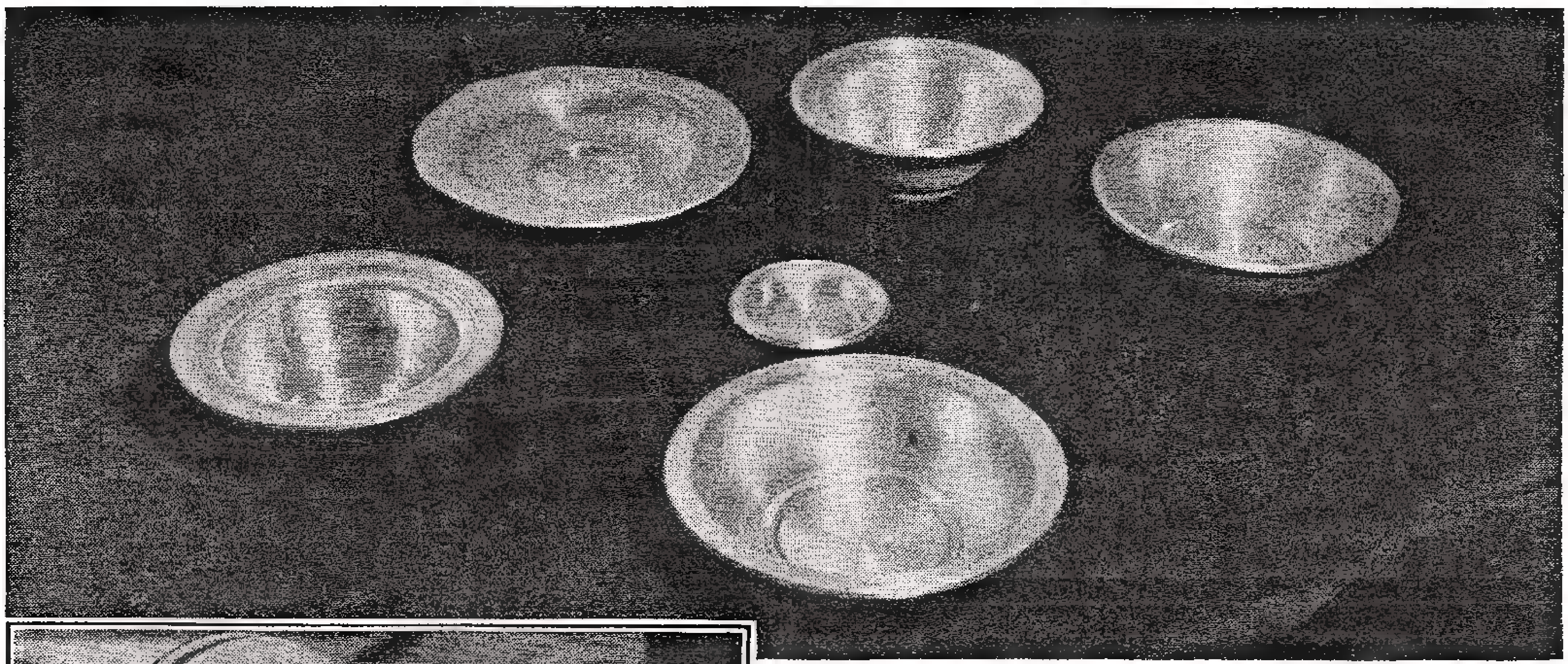
BACK in 1840 the originals of this Red River ox cart hauled rich cargoes of freight and furs through the great Northwest and made it a thriving country. Today the model will make an attractive ornament of historical interest.

The patterns for the 12 felloes you will need are made by drawing a circle the diameter of the wheel on a piece of ¾ in. thick white pine, then drawing a ⅜ in. circle inside the first. Cut out segments as shown above.

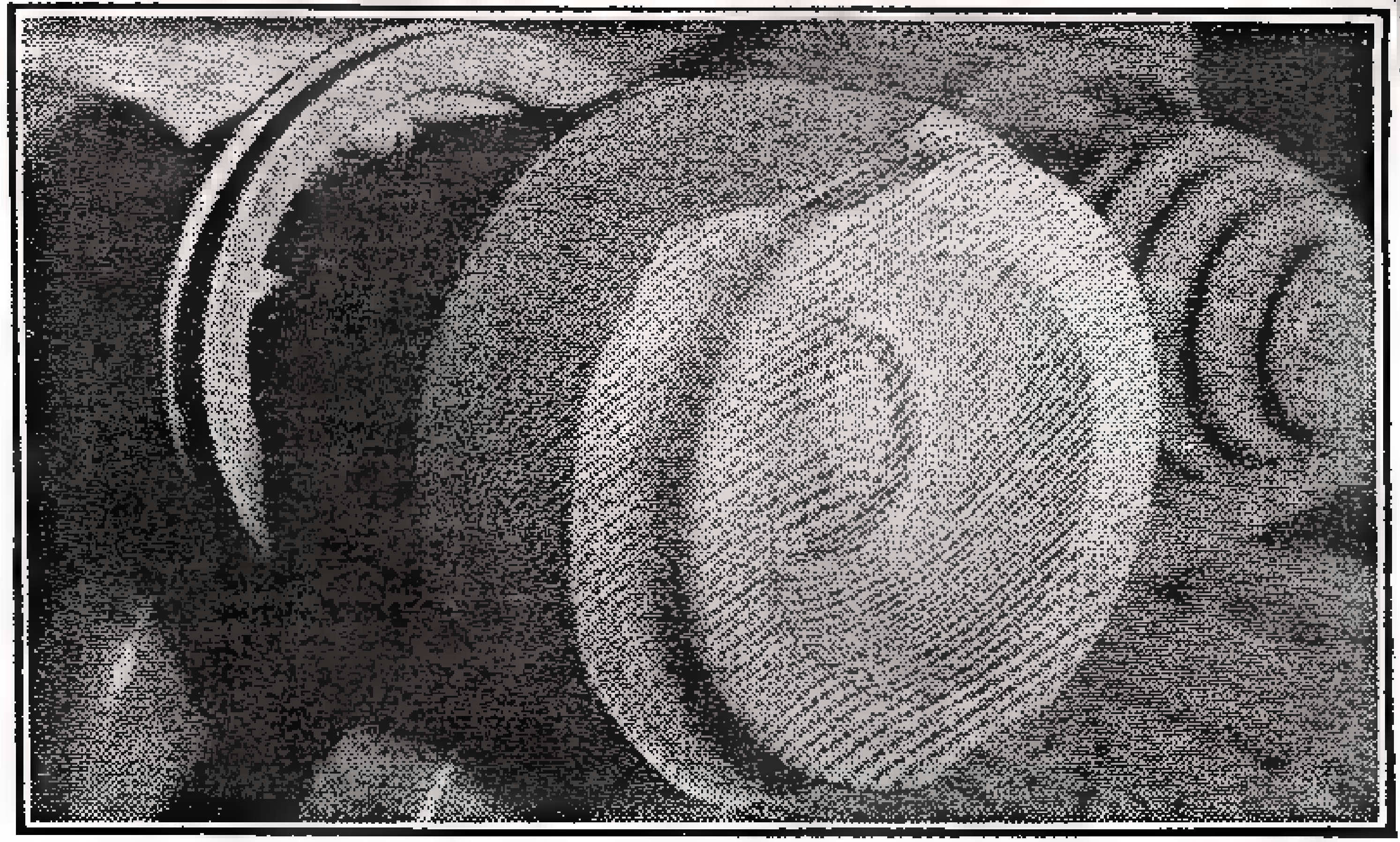
The hubs are cut in two pieces. Then put the small end in the hole of assembly board, lay felloe and place spokes, mark each piece as fitted to get it in correct place, and finally glue to hub and felloe. Dry overnight, then make up other half of hub and nail the two halves together.

Dimensions for other necessary parts are given above. Stain the completed cart a dull grayish-brown, with streaks. Place three small boards for the bottom and mount the finished cart on a baseboard.

Spinning METAL Dishes on



Lead, copper or even galvanized sheet iron can be spun into unusual and original designs on the lathe by following Dale Van Horn's instructions for spinning metal. When copper is turned it must be annealed by heating and plunging into water, the reverse process from annealing iron. These dishes are of a variety of metals, all made same way.



Almost any type of mold will do. Here is one 5 inches in diameter and about 3 inches deep. The outside does not have to be finished, but if the inside of the mold is cut smooth and then sanded it will give a smoother surface to the outside of the dish.

MUCH the same appearance can be given copper or lead or brass or aluminum dishes of small size on your own woodworking lathe as are found in the commercially spun products.

Moreover the work is fun, unusual and sometimes profitable. You can take a sheet of any soft metal having some pliableness, add the speed of the lathe, and work this flat sheet into ornate and symmetrical designs. The process is unbelievably simple and quick. One or two ordinary wooden spindles of hardwood, rounded on the ends and a bit of candle are the only tools and materials needed.

First there is the mold to make. This can be any size and shape. Mount a block of wood on the lathe face plate. Turn it down roughly round, then make a suitable matrix or concavity for your dish. If the piece is to be a shallow affair the depression should flare in slowly; if a deeper dish, more on the order of a bowl, then the concavity should match it.

Cut the depression with sharp tools to leave a smooth surface and then finish off with sandpaper. In any event, regardless of the shape of the piece to be spun, the bottom of the cut should have a flat spot at the center so the dish will set evenly and firmly.

Cut a disc of lead about 1/16" thick about 1" larger than the largest diameter of the mold, and at least four places on the rim leave slightly protruding ears as the accompanying photo shows. Small nails are later driven through these to hold the piece temporarily in place. Now lay this disc over the front of the mold, and fasten the piece by driving a small nail through each flap.

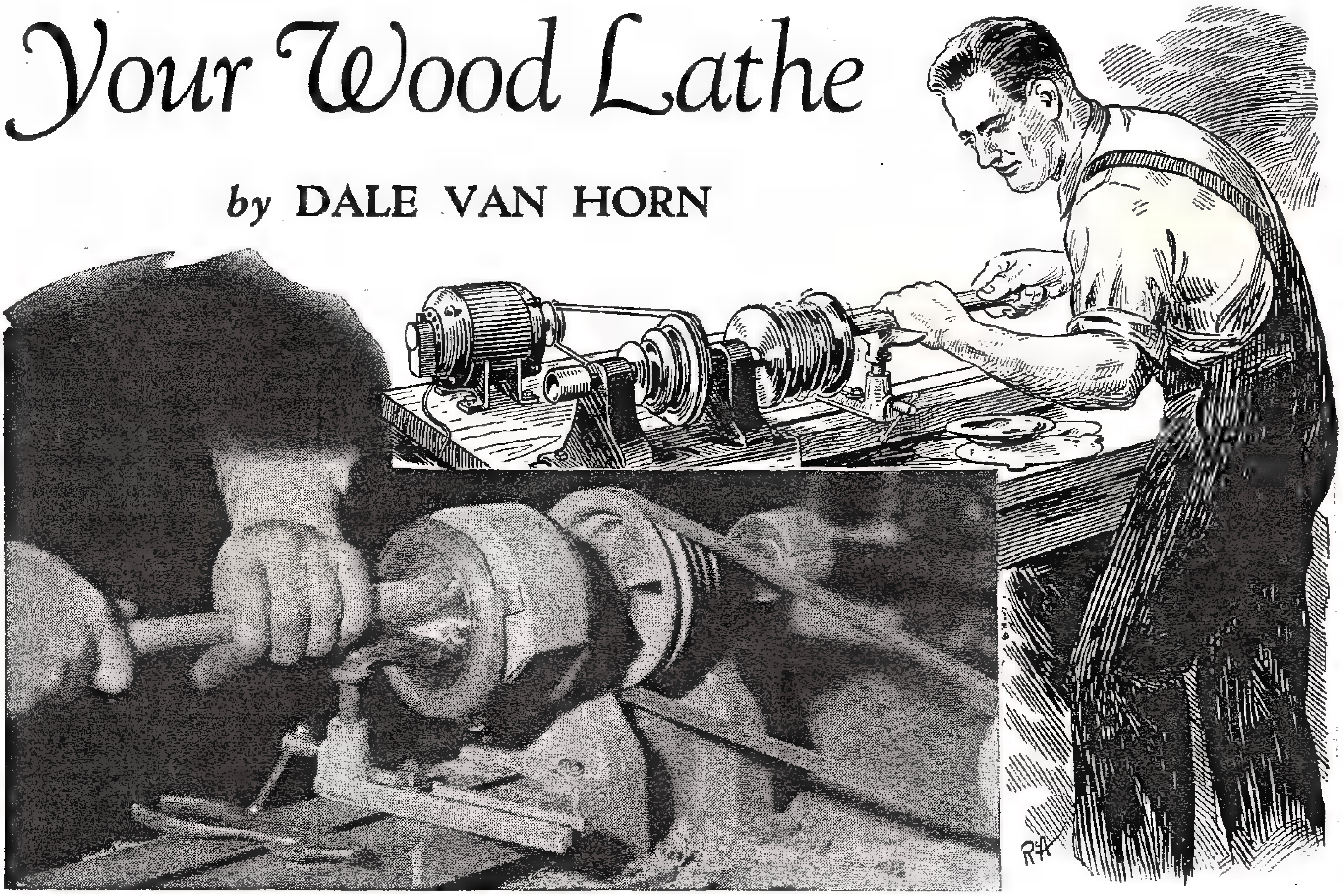
Start the lathe and rub a candle over the lead from edge to center to lubricate the surface.

Use a rounded chisel handle or other piece similar with a rounded, smoothed, hard end. A short half-inch diameter dowel

After the cup is turned the sheet to be turned is tacked on stoutly in at least four places. It is better to leave ears on the metal and turn them down this way.

Your Wood Lathe

by DALE VAN HORN



When the metal is nailed to the cup, a candle is rubbed from the edge to the center to lubricate the surface against digging and against too much heat. Then a round ended dowel of a chisel handle is pressed across the steady rest while the metal is whirling and a brightly recessed dish results.

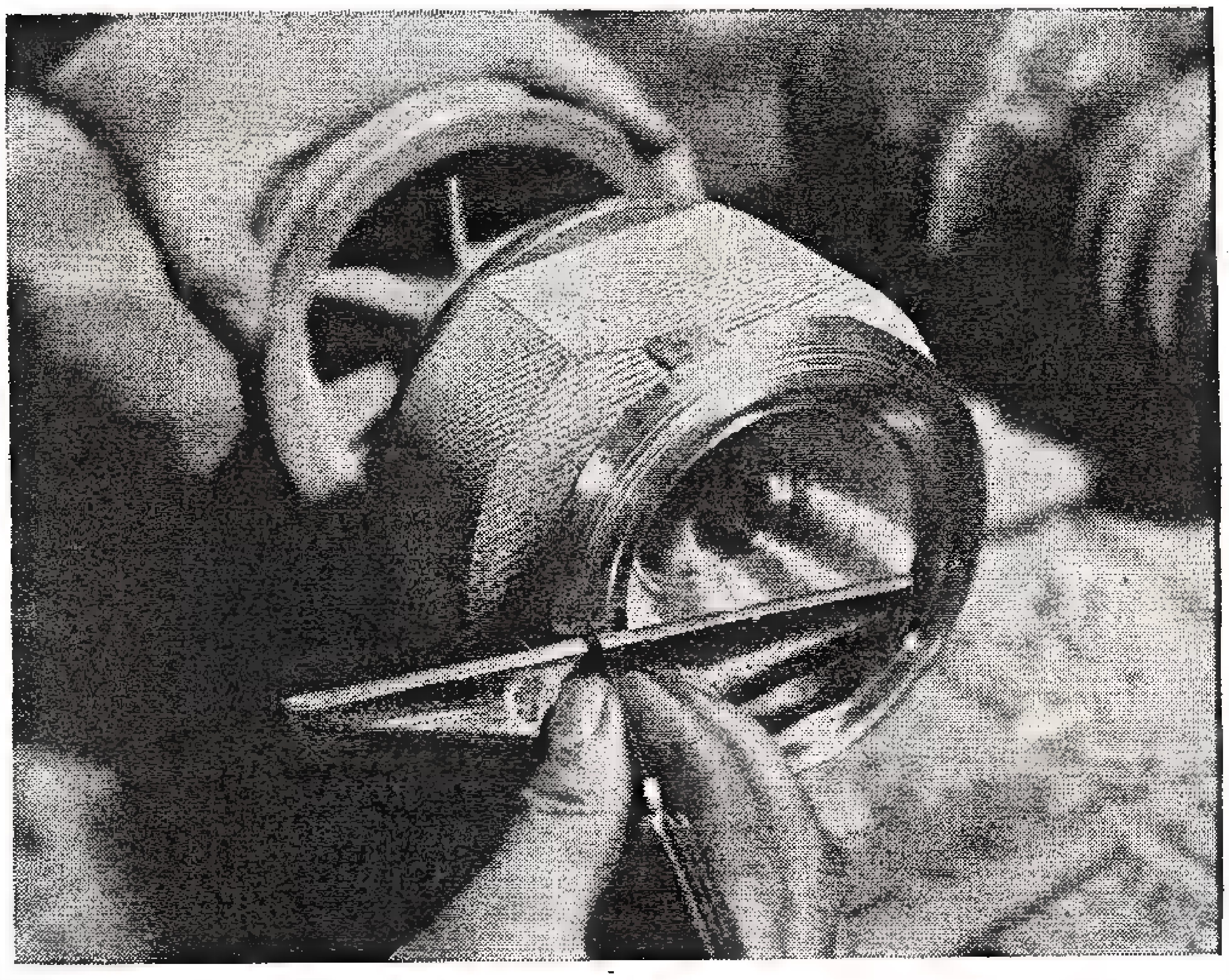
with the ends rounded will also be useful. Or one end can be shaped flat and then slightly rounded to make indentations and to smooth out rough spots. Apply the candle several times for if the surface becomes barren of the wax, the stick may cut into the lead and the blemish is hard to erase.

After the lead has been pressed firmly against the side of the mold to conform exactly to shape, go over the lining again with a smoothed rounded stick. Use a back and forth motion to produce smoothness.

Finally rub with 000 sandpaper or 000 steel wool to remove the wax. Rubbing with a fine abrasive produces a bright shiny surface which can be preserved by next rubbing with a rag dipped in clear lacquer. To prevent muddying the surface the lathe should be stopped and the lacquer put on more slowly by hand.

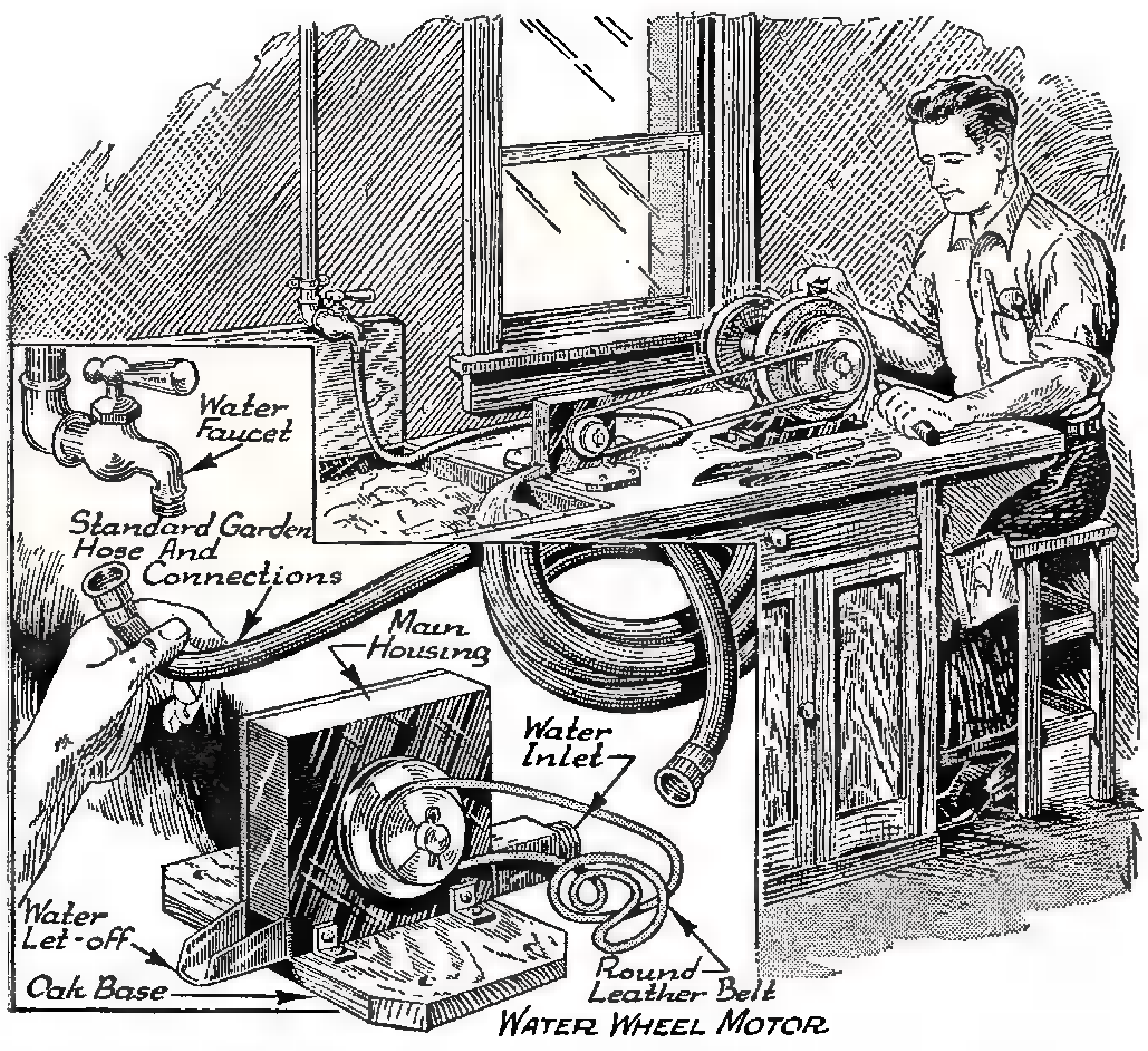
The final step is to turn the live center slowly with one hand and hold the point of a knife against the lip of the lead dish with the other so that the right kind of rim is given to the vessel at the same time it is cut off.

The dish drops out, wholly finished and good looking. Copper was found to work well in this manner, though it must be annealed. This is done by heating it and plunging it in hot water—it will harden as you work it. Aluminum can be worked in this manner, but it must be of the soft variety. Aluminum comes in soft, hard and half hard alloys and sometimes variations of these will creep in if there is much silica in the metal in impure state. Only the soft variety can be used for spinning and it must be turned over quite a bit faster than copper. It can be spun with greater safety.



The dish is finished up by brightly and lightly burnishing with 000 sandpaper or steel wool to do away with the tallow of the candle. Then a knife point is brought across the rest to cut dish at rim.

One-fourth h.p. Water Motor


Water Faucet
Standard Garden Hose And Connections
Main Housing
Water Inlet
Water Let-off
Oak Base
Round Leather Belt
WATER WHEEL MOTOR

Many communities have water power in abundance. It is in such places as these that a water motor shines as a prime mover. Here is shown a typical water wheel application, driven by a stream from the water tap.

by

ORVILLE HICKMAN

WATER wheels are the earliest forms of prime movers and have always fascinated engineers. In today's usage water wheels have been almost entirely supplanted by turbines because of the greater efficiency. Water wheels are in general of three classes:

Overshot wheels, which receive the water and pass it over the top, and are of a diameter less than the total head of water; breast wheels, which receive the water on the upstream side and which pass it underneath being used for medium heads of water; and undershot wheels, which are rotated by the water passing below them and which are adapted to lowest heads.

Works From Tap Water

So in designing the water wheel here, realizing that many would want to build it for experimental uses and that the heads of water would vary a lot, I chose the undershot wheel with Poncelet type buckets as being the wheel which would work anywhere and even under rather high heads for so small a motor, say up to 60 lbs., which is tap water average pressure.

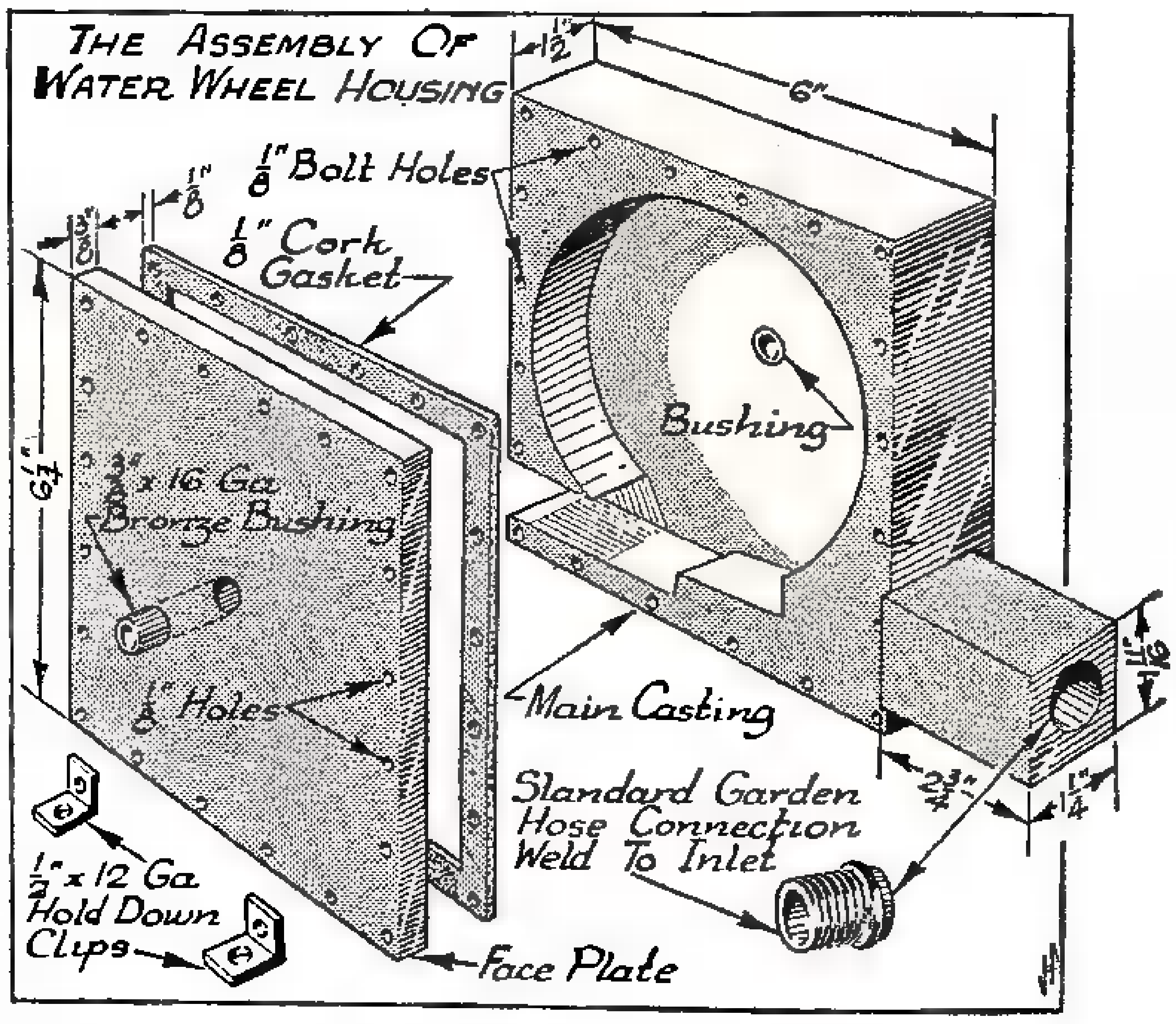
The first thing to do in building this wheel is to build the pattern for the box, that is, the main casting. It is best to cast this jacket of aluminum as it is easy to machine if turpentine is used on the cutting tool and it is the lightest of the metals which are available for this kind of work.

Care should be used in the making of this pattern as this is important to the success of the wheel. You can take the layout shown in the drawings and enlarge it by squares to final size to get the degree of annularity of orifice, etc.

The wheel is to be made of bronze. This requires a pattern also which can be made on a lathe. It should be about 1/16 larger than the original size so that there will be some leeway for machining.

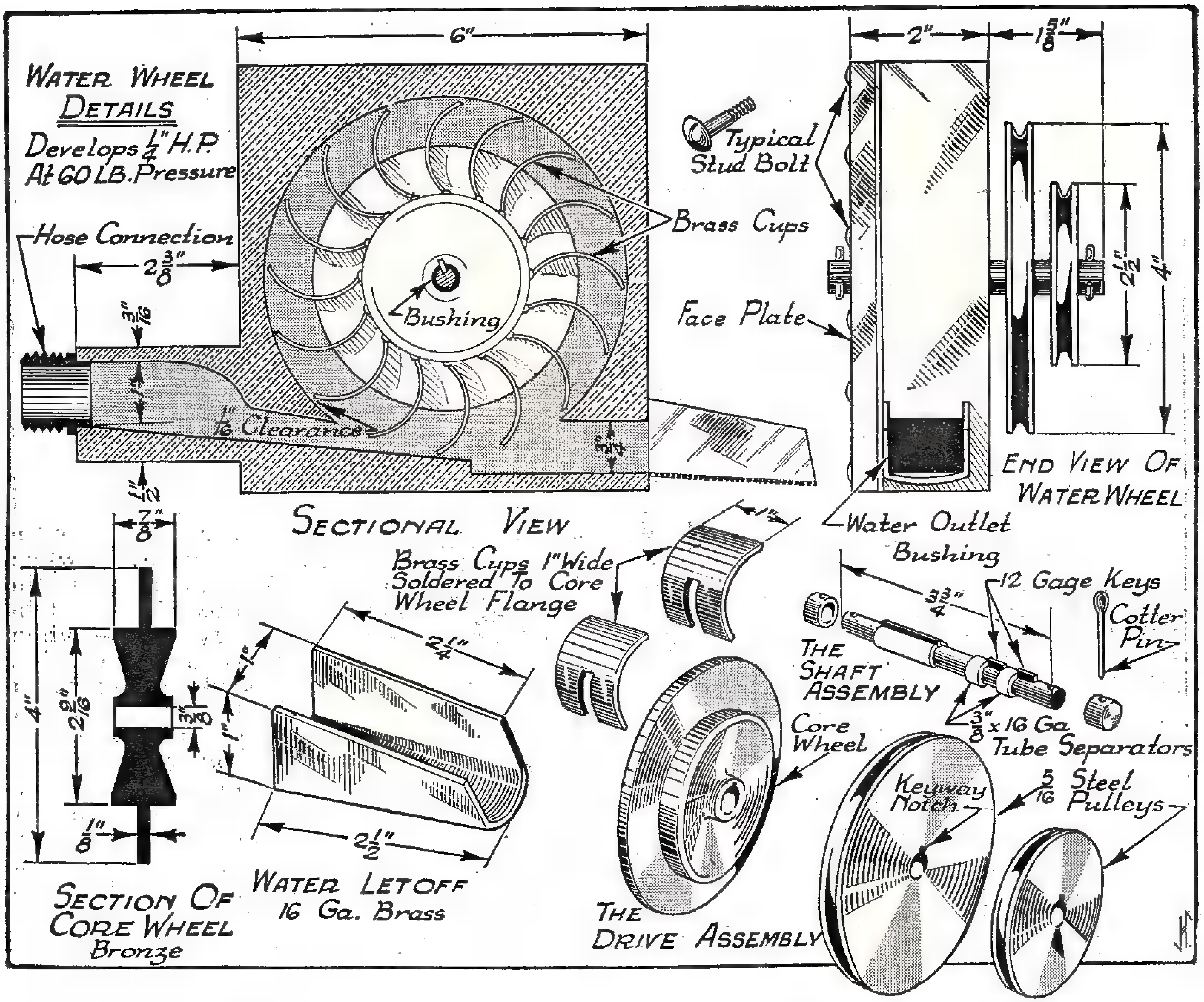
There is some question as to the correct amount of clearance between the wheel and the race, and a good rule to follow is the closer the better the efficiency. In laying the wheel out for the spacing of the buckets or cups, this must be done accurately or the wheel will not be in balance. Thus all of the work would be in vain, and the wheel would vibrate badly. In sawing the slots for the wheel there is a small hacksaw blade on the market which is available at most hardware stores that is about ¼" in depth that is just about the thing to use in cutting this curved groove in the casting. Machine the casting first and then cut the grooves in. The cups can be made out of sheet brass with a hard temper. Cut these all just the same and trim up neatly, curve to the desired shape and then insert in the wheel.

In soldering these cups be sure that you don't get too much solder on one cup, and not enough on the next or this will throw the wheel out of balance, too. After you have all the cups soldered in, and the shaft


THE ASSEMBLY OF WATER WHEEL HOUSING
1½"
6"
1/8" Bolt Holes
1/8"
3/8"
1/8" Cork Gasket
Bushing
6¼"
3/8" x 16 Ga. Bronze Bushing
1/8" Holes
Main Casting
1 1/16"
2¾"
1¼"
Standard Garden Hose Connection Weld To Inlet
½" x 12 Ga. Hold Down Clips
Face Plate

The water wheel which Hickman has designed is of very simple Poncelet type with a cast aluminum case and a sheet and gasket face which simplifies the job of building.

Poncelet Type Undershot Wheel of Simple Design Is 38% Efficient


WATER WHEEL DETAILS
Develops ¼" H.P. At 60 LB. Pressure
6"
Hose Connection
2⅜"
3/16"
1/16" Clearance
Bushing
Brass Cups
Typical Stud Bolt
Face Plate
2"
1⅝"
2½"
4"
END VIEW OF WATER WHEEL
Water Outlet Bushing
SECTIONAL VIEW
Brass Cups 1" Wide Soldered To Core Wheel Flange
2¼"
1"
2½"
WATER LETOFF 16 Ga. Brass
7/8"
4"
2 9/16"
3/16"
1/8"
SECTION OF CORE WHEEL Bronze
3¾"
12 Gage Keys
Cotter Pin
THE SHAFT ASSEMBLY
⅜" x 16 Ga. Tube Separators
Core Wheel
Keyway Notch
5/16 Steel Pulleys
THE DRIVE ASSEMBLY

The Poncelet type wheel with the curved buckets is about 38 per cent efficient. The water enters through the modified venturi orifice, fills each bucket up to a certain point and then scavenges itself on the upturn. The core wheel is of bronze so as to give weight to the rotor and to make it easy to solder the blades on. Power varies with the water pressure.

in the wheel, put it on a knife edge trunnion and balance up by adding solder until the light side is perfectly compensated. It should then stay in any place you put it.

The shaft that we are using here may seem rather small to you but is all right. It is not any detriment to the wheel if you want to use a ⅜" shaft, the length has been left optional. In placing the shaft in the casting make it a press fit, or you can use a key in the shaft or a set screw.

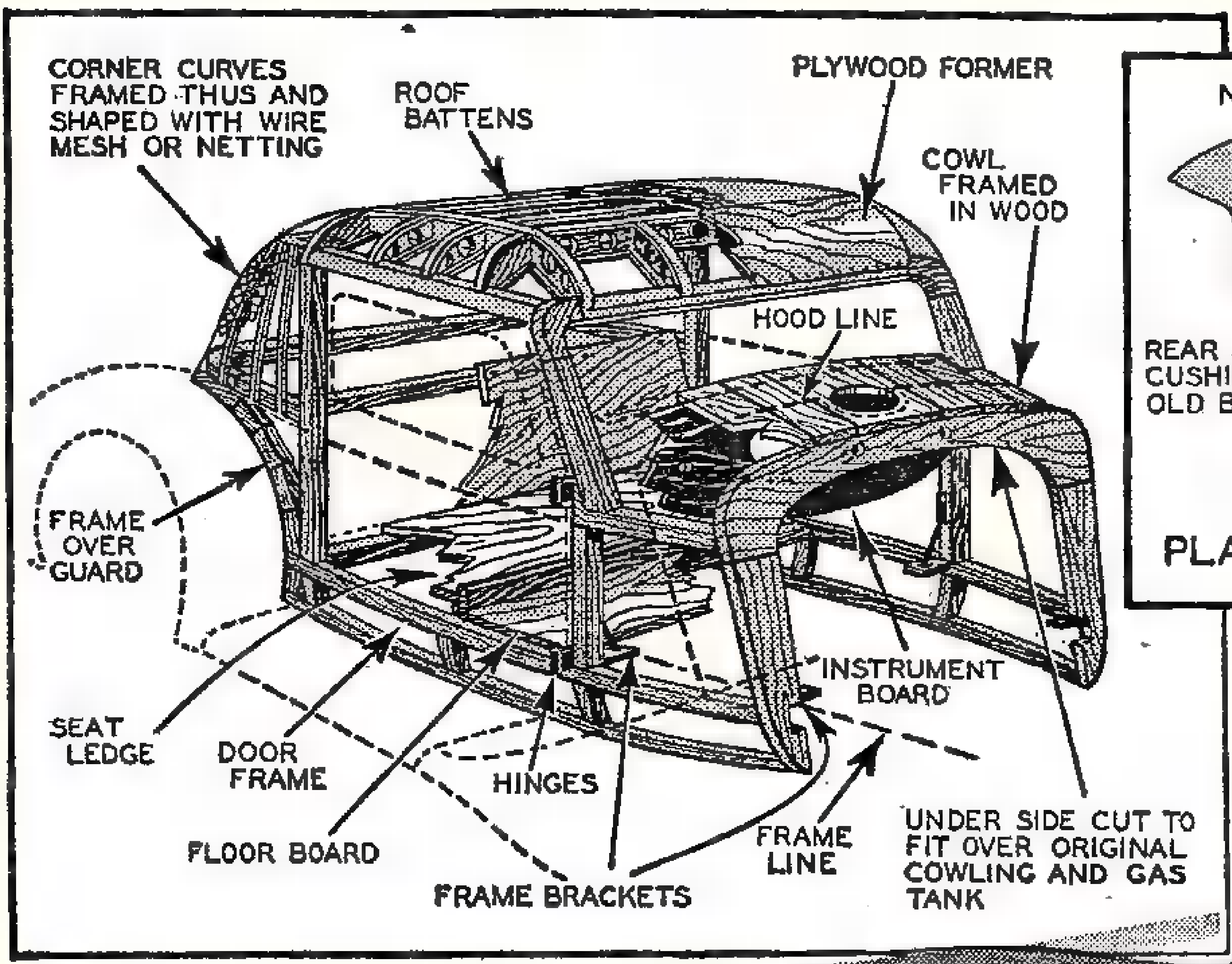
The bearings that are used on the shaft are pressed into the case and will use very little oil, in fact there should be enough water there for lubrication. In machining the case you will have to have a lathe. First core out the race for the wheel after locating the center of the casting. The opening for the water inlet is bored next and the runway for the water is drilled in the back of the hold or the bottom. The best way is to drill two small holes and then saw between them. Then drill the outlet for the water.

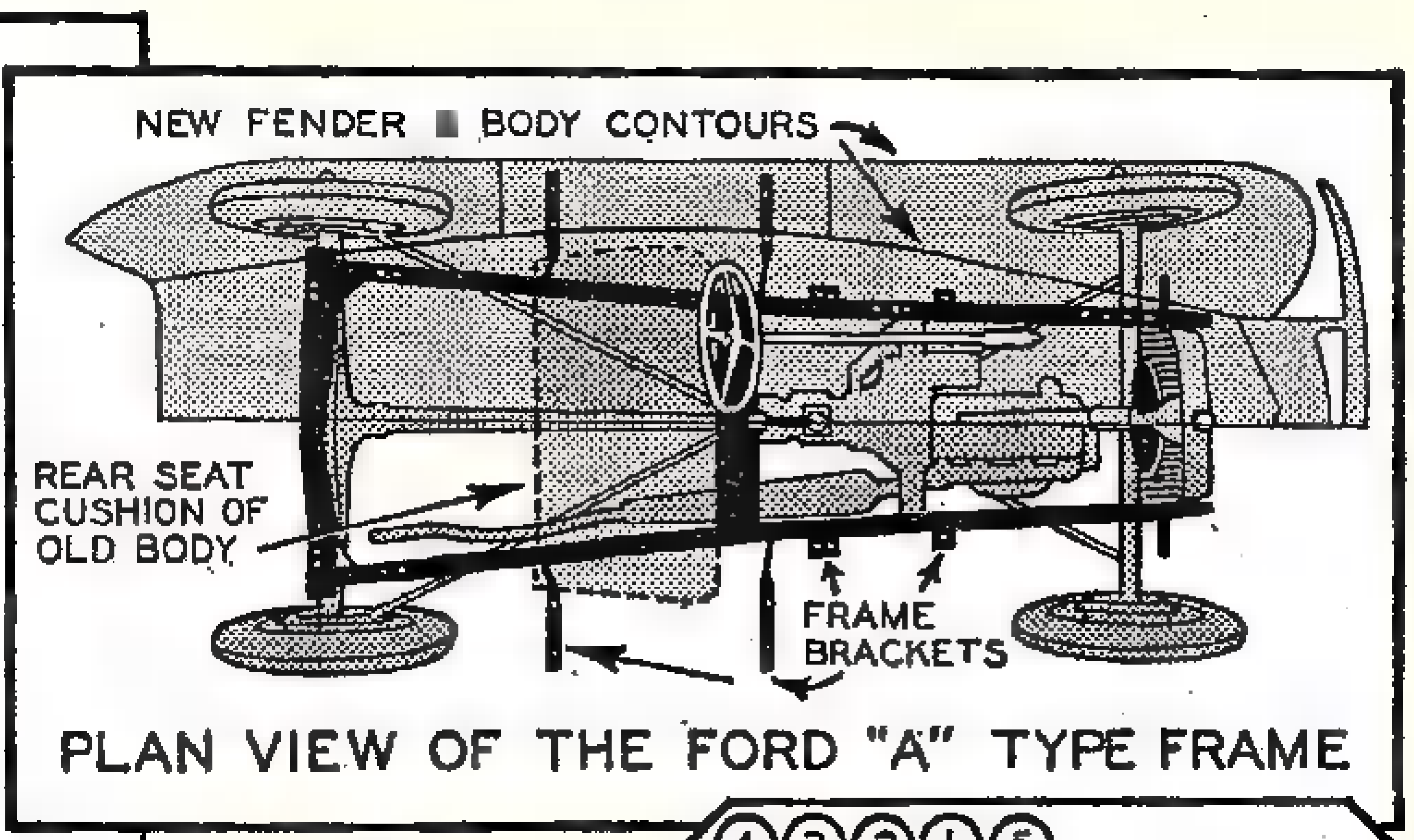
The thread for the water connection is a standard 1" garden hose size and can be used with water hose as a connection between the water supply and the motor, then you can move the wheel around any place that you want.

One side of the case is open. You next make a cover for this open side. This is a flat casting ⅜" thick and the same outside dimensions as the main case. The bearing is located in this case just opposite the one in the main case, and is bolted to the main case with ⅛" stud bolts with a cork packing between the two. It is necessary that this packing be cut out the diameter of the wheel so it won't rub on the wheel. You can place any type of drive on the shaft —a pulley or a gear drive to whatever you want to use the wheel to power.

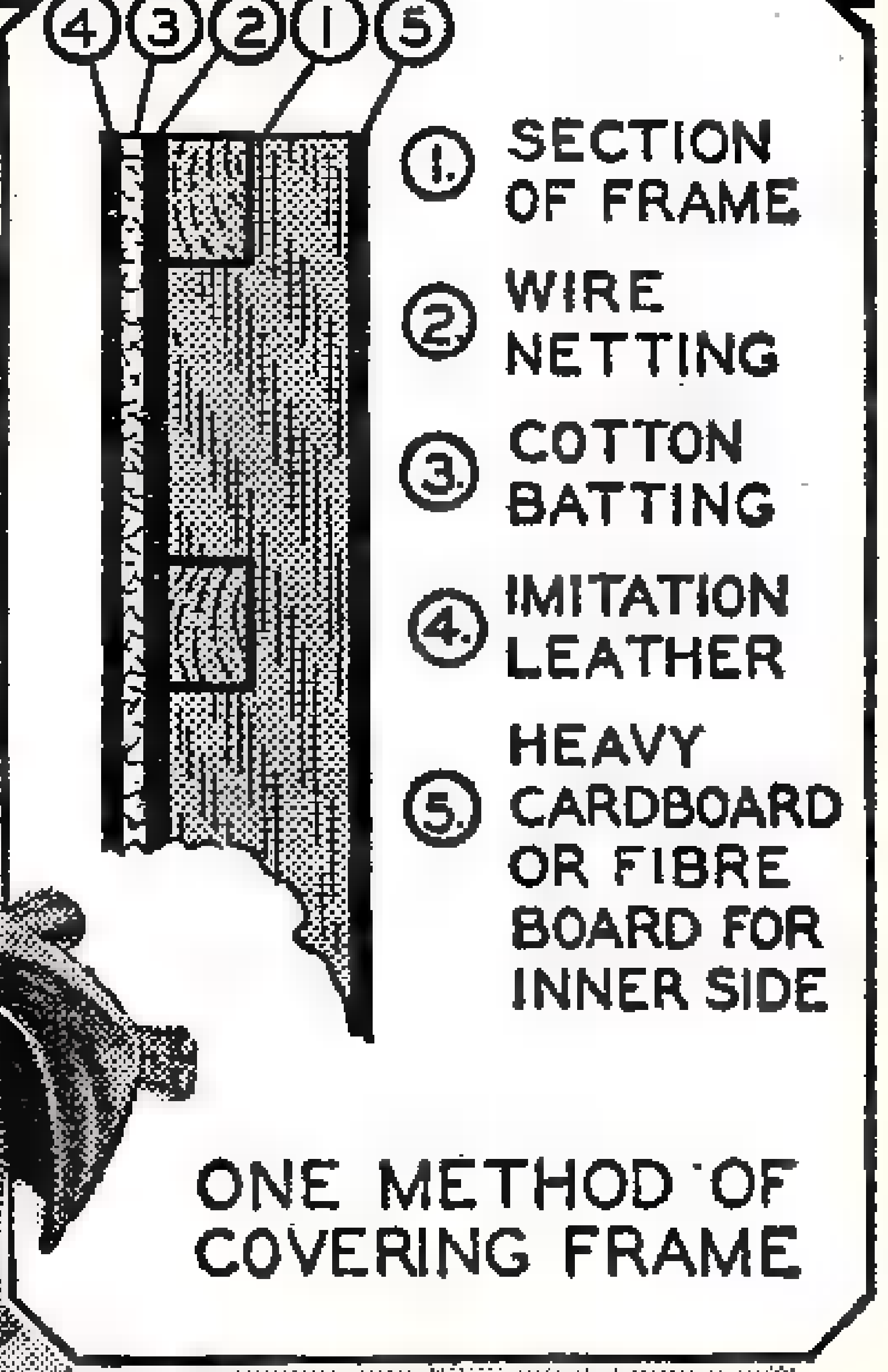
Assemble the wheel now and see that it runs freely in the bearings before you connect it up with the water supply. Another thing that you want to take care of is the water that passes through the wheel. It is best to operate in the sink or any other means that will take care of the used water. Of course, the more pressure, the more speed and power that you can get. Follow the plans carefully and you will have a very powerful motor that will give lots of fun and work.

A 1933 AUTOMOBILE for $75!


CORNER CURVES FRAMED THUS AND SHAPED WITH WIRE MESH OR NETTING
ROOF BATTENS
PLYWOOD FORMER
COWL FRAMED IN WOOD
HOOD LINE
FRAME OVER GUARD
SEAT LEDGE
DOOR FRAME
HINGES
INSTRUMENT BOARD
FLOOR BOARD
FRAME BRACKETS
FRAME LINE
UNDER SIDE CUT TO FIT OVER ORIGINAL COWLING AND GAS TANK

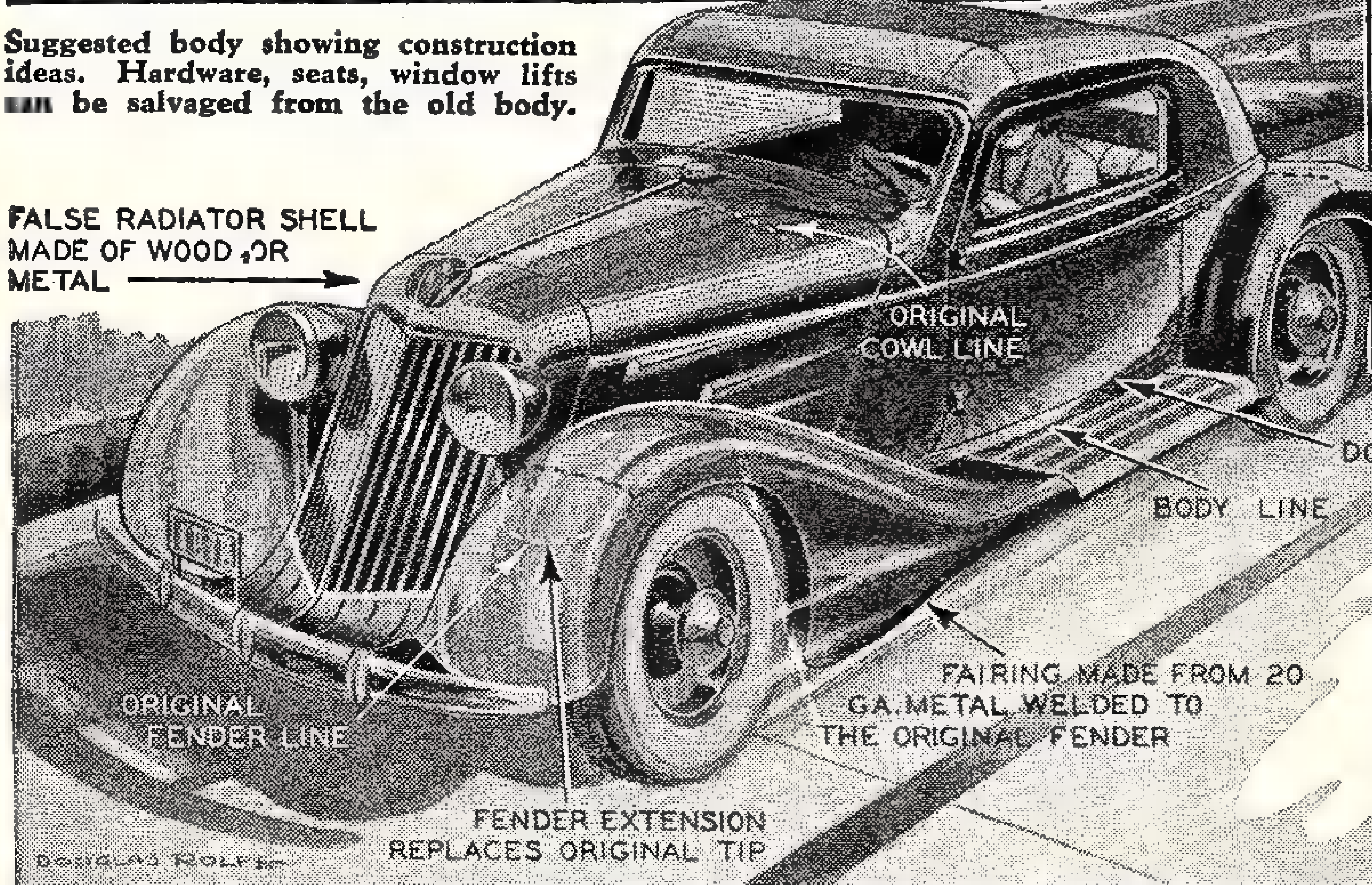

NEW FENDER & BODY CONTOURS
REAR SEAT CUSHION OF OLD BODY
FRAME BRACKETS

PLAN VIEW OF THE FORD "A" TYPE FRAME

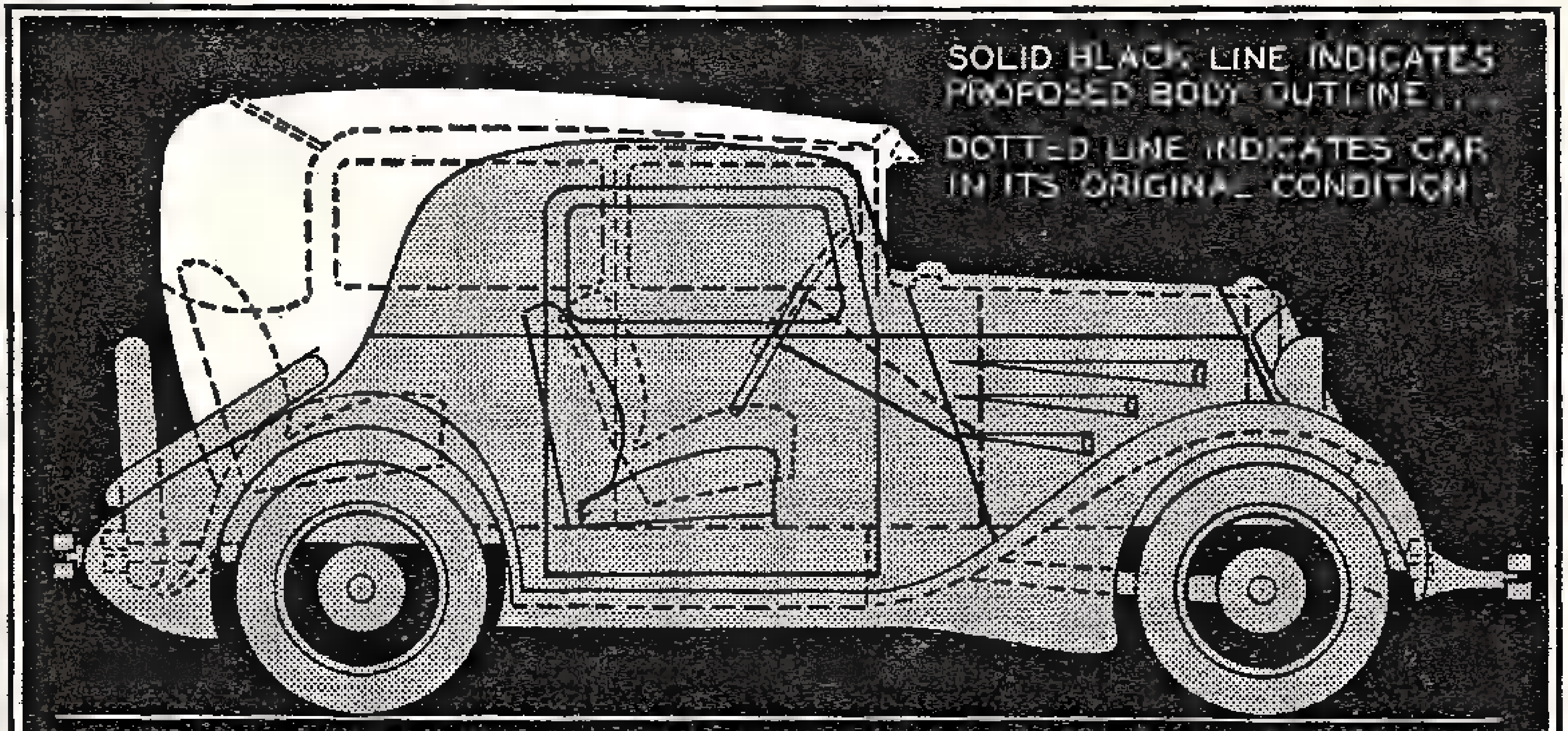

④③②①⑤
① SECTION OF FRAME
② WIRE NETTING
③ COTTON BATTING
④ IMITATION LEATHER
⑤ HEAVY CARDBOARD OR FIBRE BOARD FOR INNER SIDE

ONE METHOD OF COVERING FRAME

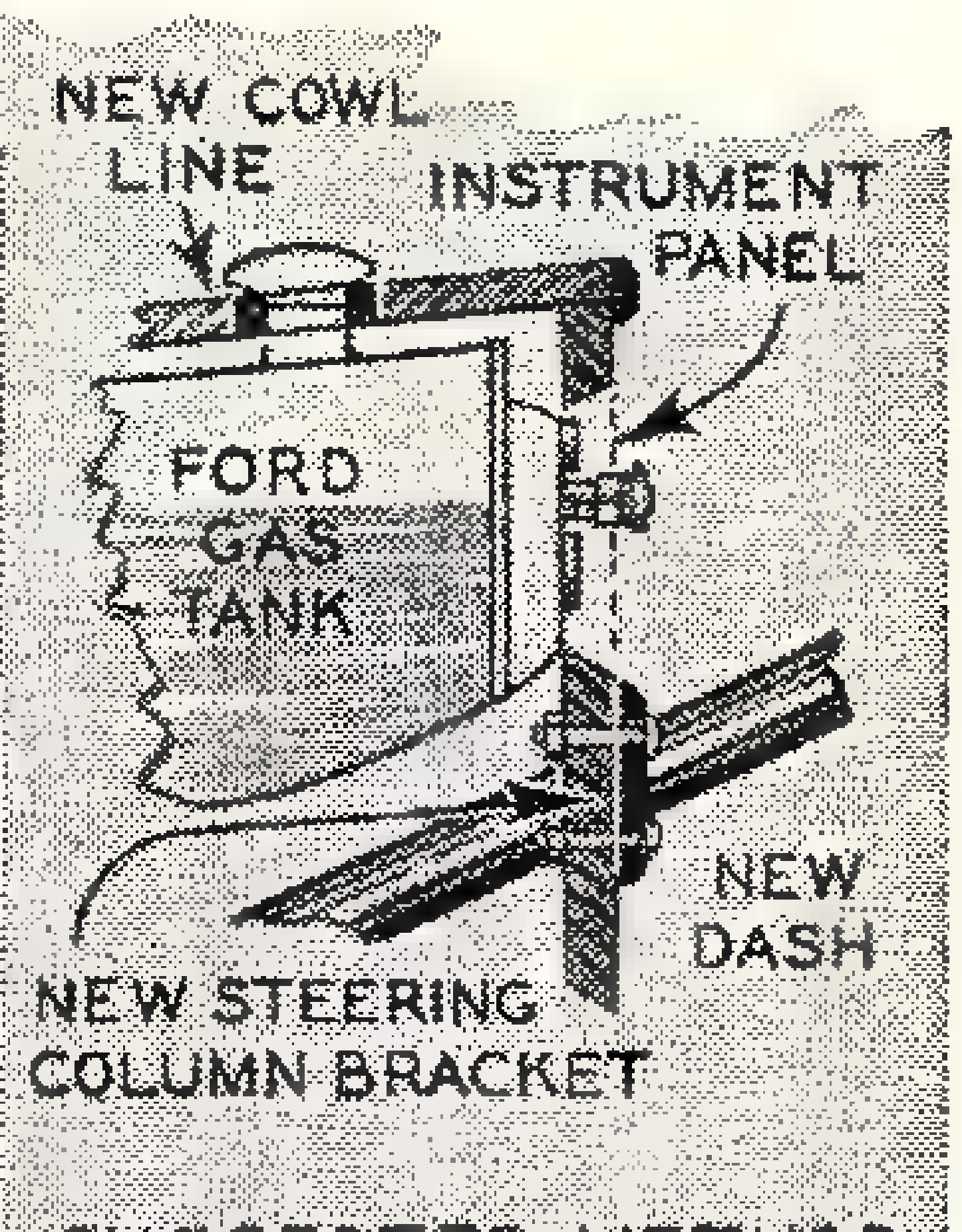
Suggested body showing construction ideas. Hardware, seats, window lifts can be salvaged from the old body.


FALSE RADIATOR SHELL MADE OF WOOD OR METAL
ORIGINAL COWL LINE
DOOR LINE
BODY LINE
FAIRING MADE FROM 20 GA. METAL WELDED TO THE ORIGINAL FENDER
ORIGINAL FENDER LINE
FENDER EXTENSION REPLACES ORIGINAL TIP
DOUGLAS ROLFE

The smart looking car with 1933 lines shown at left is not beyond the abilities of a capable amateur. Welded additions to fenders can be eliminated if equipment is not available. Body construction is not difficult, following methods shown.


SOLID BLACK LINE INDICATES PROPOSED BODY OUTLINE...
DOTTED LINE INDICATES CAR IN ITS ORIGINAL CONDITION

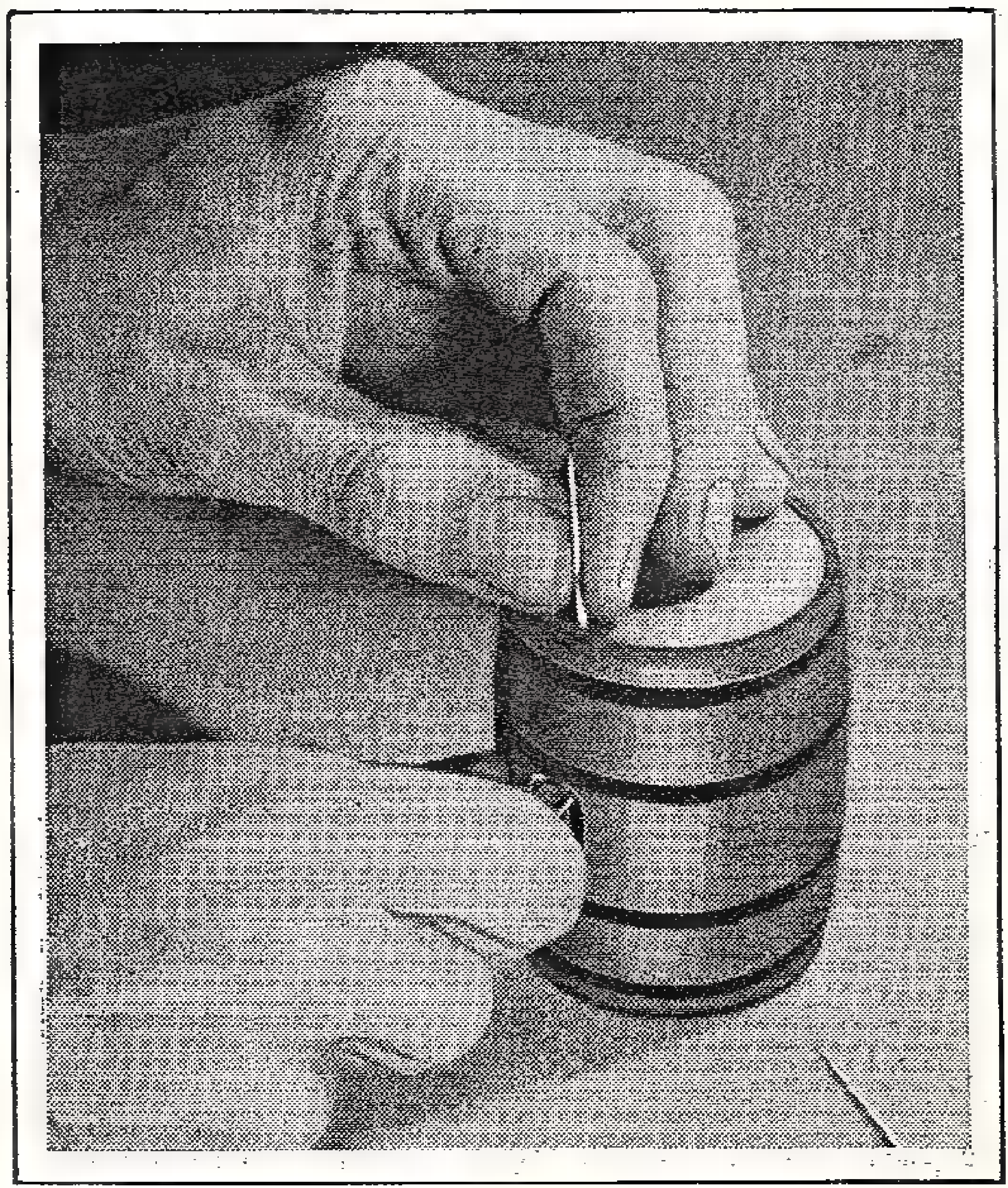
SUGGESTED BODY LINES FOR A REMODELED CAR — IN THIS INSTANCE A 1929 OR 1930 FORD. THE MAJOR FEATURES OF MODERN DESIGN ARE INCORPORATED IN THIS NOVEL RE-BUILD


NEW COWL LINE
INSTRUMENT PANEL
FORD GAS TANK
NEW DASH
NEW STEERING COLUMN BRACKET

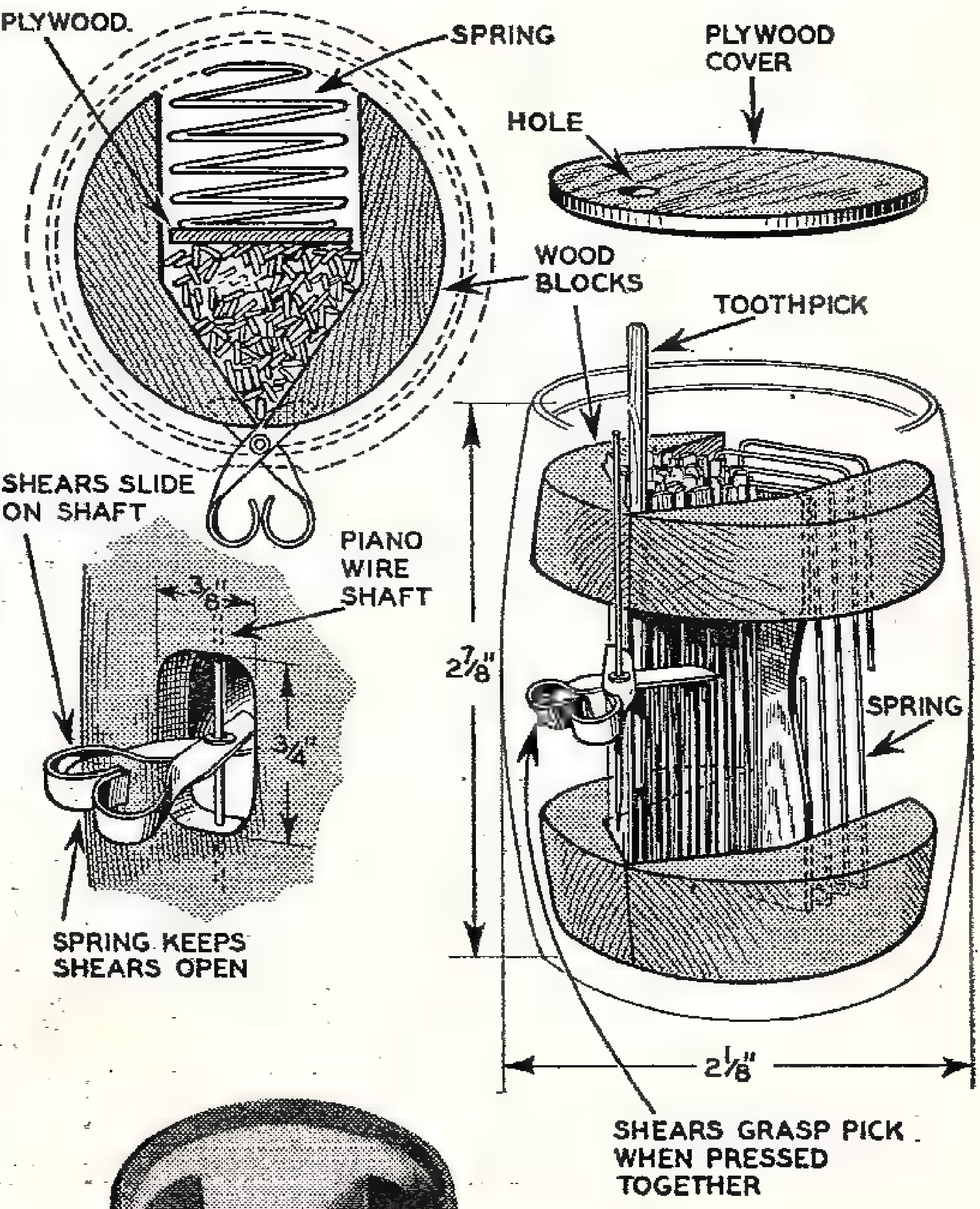
SUGGESTED METHOD OF UTILIZING FORD TANK AND INSTRUMENT PANEL ON NEW BODY

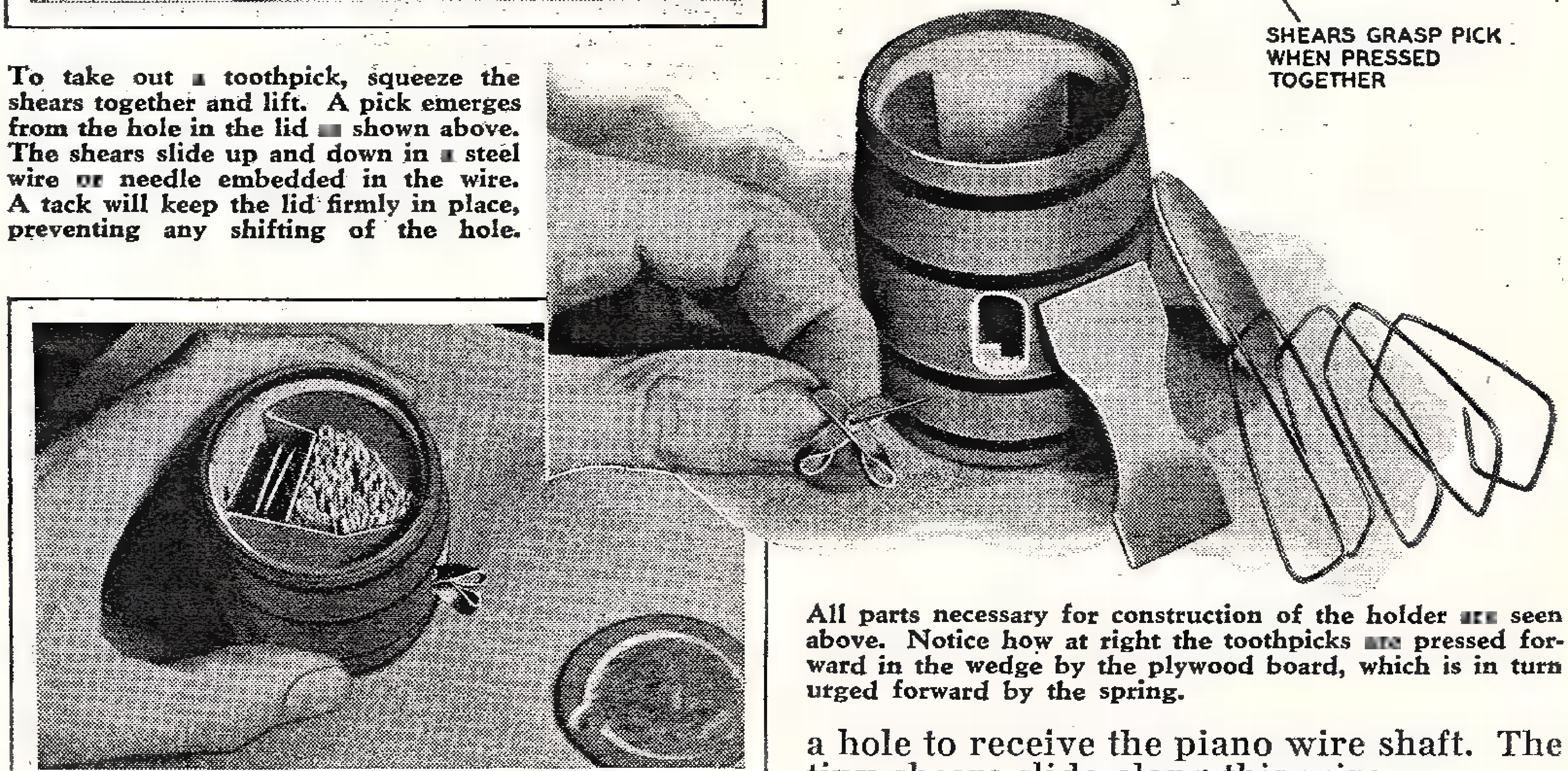
1933 auto body styles represent a distinct approach to streamline form. A small used car chassis can be picked up for a song at present prices and a body shell distinctly up to the minute built over it, along the lines suggested above. Total cost of chassis and body should not run over $75. The use of a wooden frame and fabric body covering makes very little metal work necessary. Detailed plans are not given, as dimensions and design can be adapted to individual taste. A Model A Ford frame adaptation is shown, but a chassis of any similar low-priced car can, of course, be employed.

Midget Barrel Delivers You a Toothpick



To take out a toothpick, squeeze the shears together and lift. A pick emerges from the hole in the lid as shown above. The shears slide up and down in a steel wire or needle embedded in the wire. A tack will keep the lid firmly in place, preventing any shifting of the hole.





All parts necessary for construction of the holder are seen above. Notice how at right the toothpicks are pressed forward in the wedge by the plywood board, which is in turn urged forward by the spring.

A NOVEL holder that delivers one toothpick at a time is made in the form of a miniature barrel. When a pair of projecting handles are pressed between the fingers and raised upward, a pick emerges through a hole in the top.

The barrel is turned down from a block of maple to the dimensions given in the above drawings. The hoops are raised portions of the wood. Bore out the inside and turn a ledge around the edge for the lid.

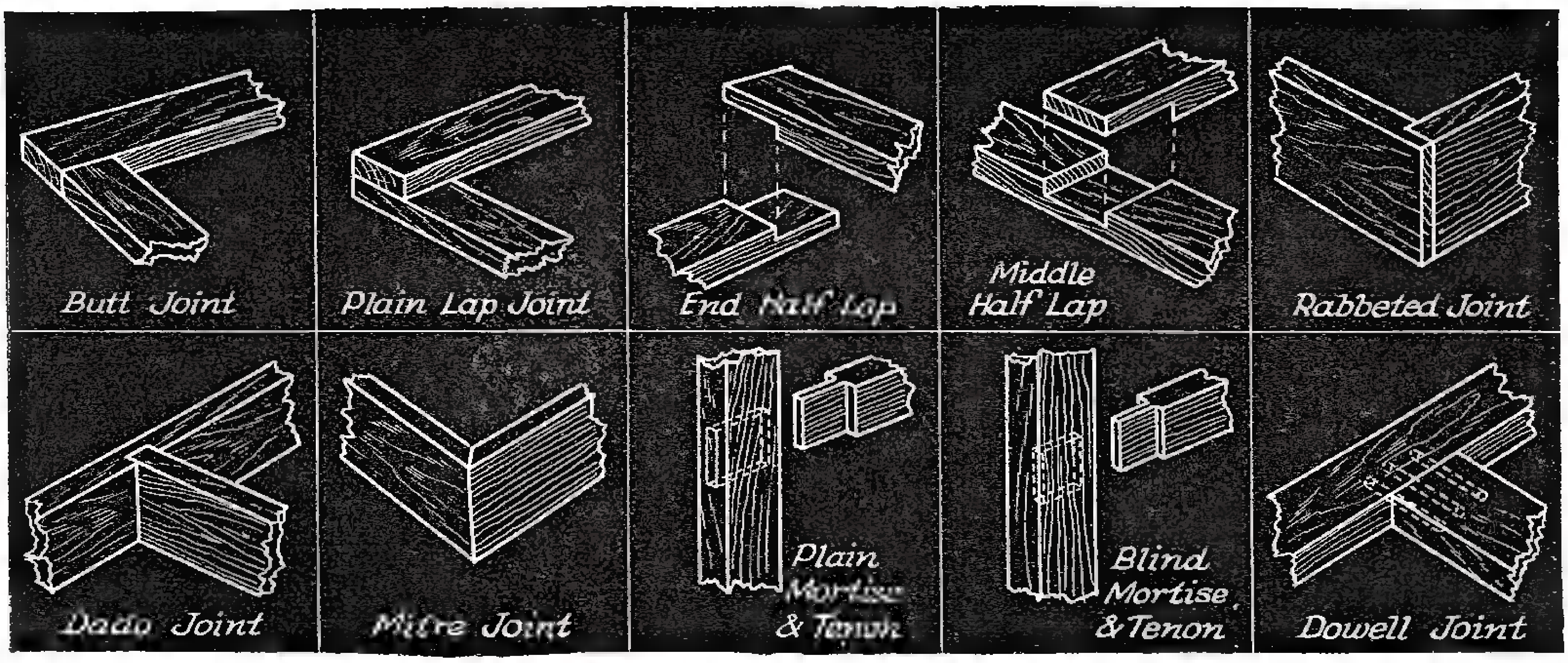
Then cut in the side of the barrel the oblong opening for the shears, as illustrated above. These shears are made from any sheet steel stock, the handles being shaped so they will spring apart after being pressed together. Sharpen the blades, rivet the two halves together, and through the rivet drive a hole to receive the piano wire shaft. The tiny shears slide along this wire.

Inside the container glue four wood blocks, two at the top and two at the bottom, shaped as illustrated above. Then cut a piece of thin plywood so it will slide freely in the straight part of the opening like a plunger, to exert a pressure on the picks.

Make the lid next and drill in it a hole directly above the shears. When the handles of the shears are pressed together, the blades grasp a pick; and when the handles are moved upward, the pick emerges through a hole in the lid, where it can be easily grasped.

Drive a small pin into the joint formed by the lid edge of the barrel, so that the lid will be held in a fixed position. The barrel is more attractive if painted in brilliant colors.

Ten Standard Wood Joints Suited to Special Purposes



Every so often need arises for constructing a joint stronger than the common nailed-corner type. Here are some suggestions.

As a refresher to you who have only occasional woodworking to do, let this folio of ten highly useful wood joints serve when the need arises for the "right joint in the right place."

Left top above is a plain butt joint. This is widely used in making boxes and crude picture frames. Has end grain and is not strong.

Picture two, top row, is a lap joint. Widely used in making crates and quick scaffolding.

Number three is an end half lap joint. This type of joint is used by pattern makers, cabinet makers and others where a frame is desired that cannot slip when frame-tension such as that imposed by seat grating, etc., is found in the structure.

Middle half lap is great for door framing and commonly used in screen making. It requires careful mortising; made with saw and chisel.

The rabbeted end joint is the right way to join two edge pieces, such as drawer sides, when end grain must be concealed to prevent chipping. This is the proper joint for all simple drawer faces.

The dado joint is always cut across the grain where a flat piece is keyed into the supporting member. Widely used in drawer partitions, and for shelves in book cases.

A true mitre joint is next shown. This very useful joint is well known to most but has a number of variations. In most cases it is used to bring two pieces of wood together which are of the same dimensions in depth and breadth. It is in such cases cut at 45 degrees, and the end grain, if the job be properly done, is cut smooth with a sharp plane, and the joint glued up with hot pattern makers' glue. Another variation of the joint is to omit the glue and to dowel the ends together with blind dowels, and while this is stronger, it requires a tool handler of great skill to effect success.

Sometimes the mitre is at an odd angle, as when two pieces of different widths are brought together. In such cases the angle is arrived at by laying the larger over the smaller and sawing on a line which bisects resultant rectangles.

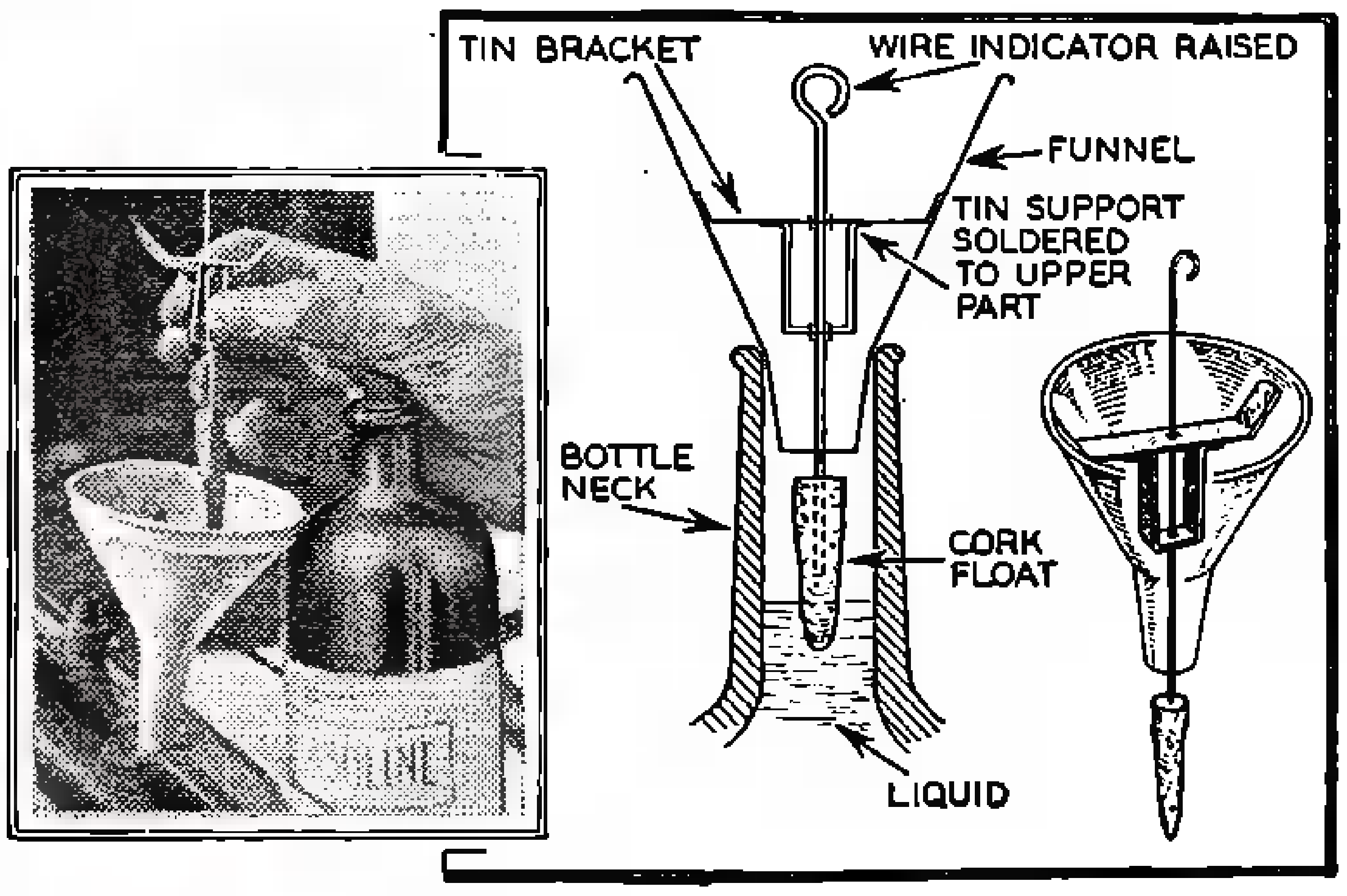
For ladders, or for frames where panels are used such as door frames, and so on, the mortise and tenon joint is commonly used. It is a joint which is made by boring the four corners of the socket with a small-radius drill, and then chiseling out between these holes. Blind mortise and tenon is commonly used on tables where strength is needed, along with fine finish.

In such cases as in the making of tables and chair braces a substitute for the mortise and tenon is a doweled or straight dowel-tenon (pronounced tenyon) joint. This is shown in the last drawing above.

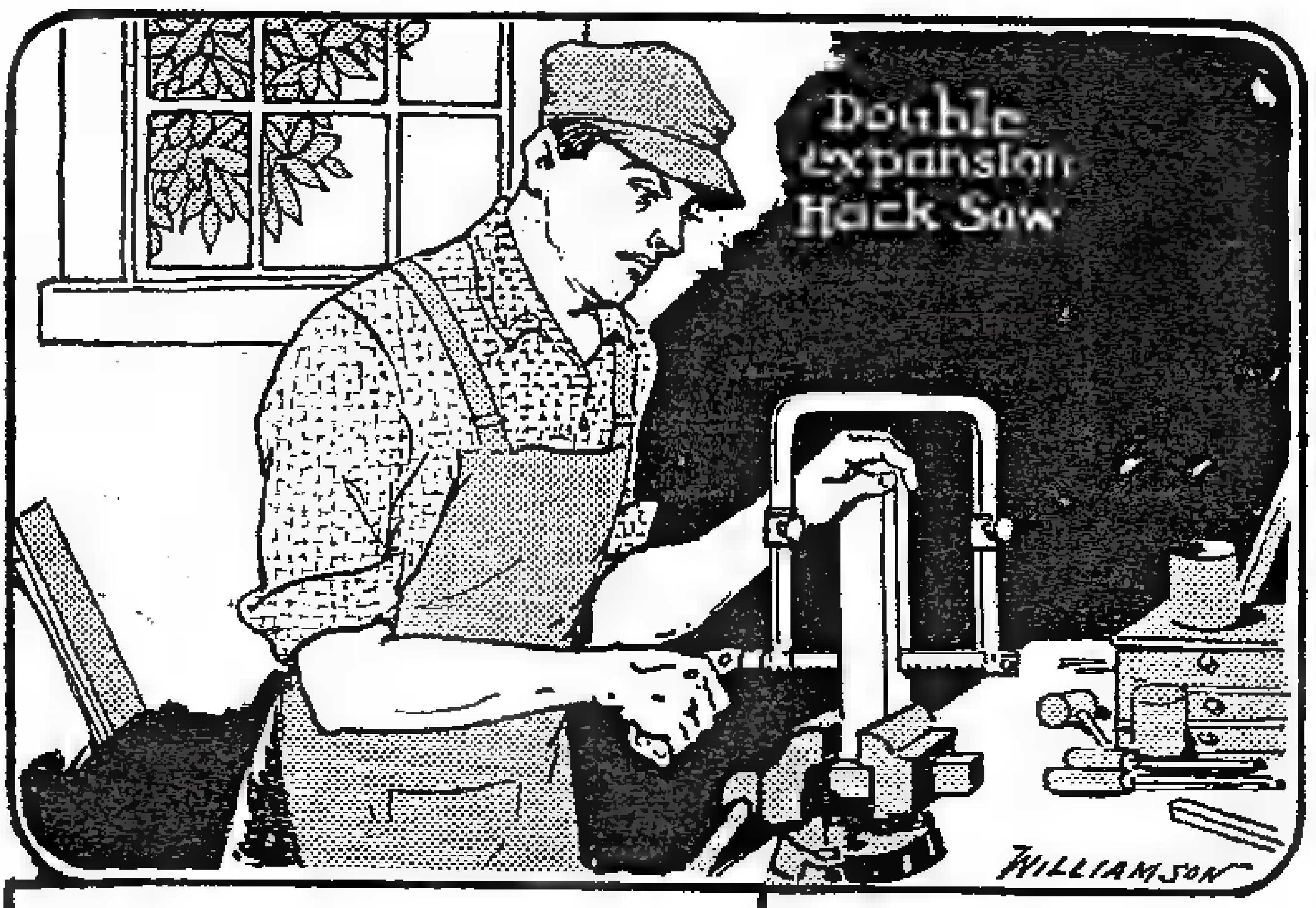
When making crates in which furniture is being shipped, make up a handclasp joint, not shown. The joint is a three-way plain lap joint, the ends run over a little and tied in three ways with finishing nails.

Cork Indicator for Funnel

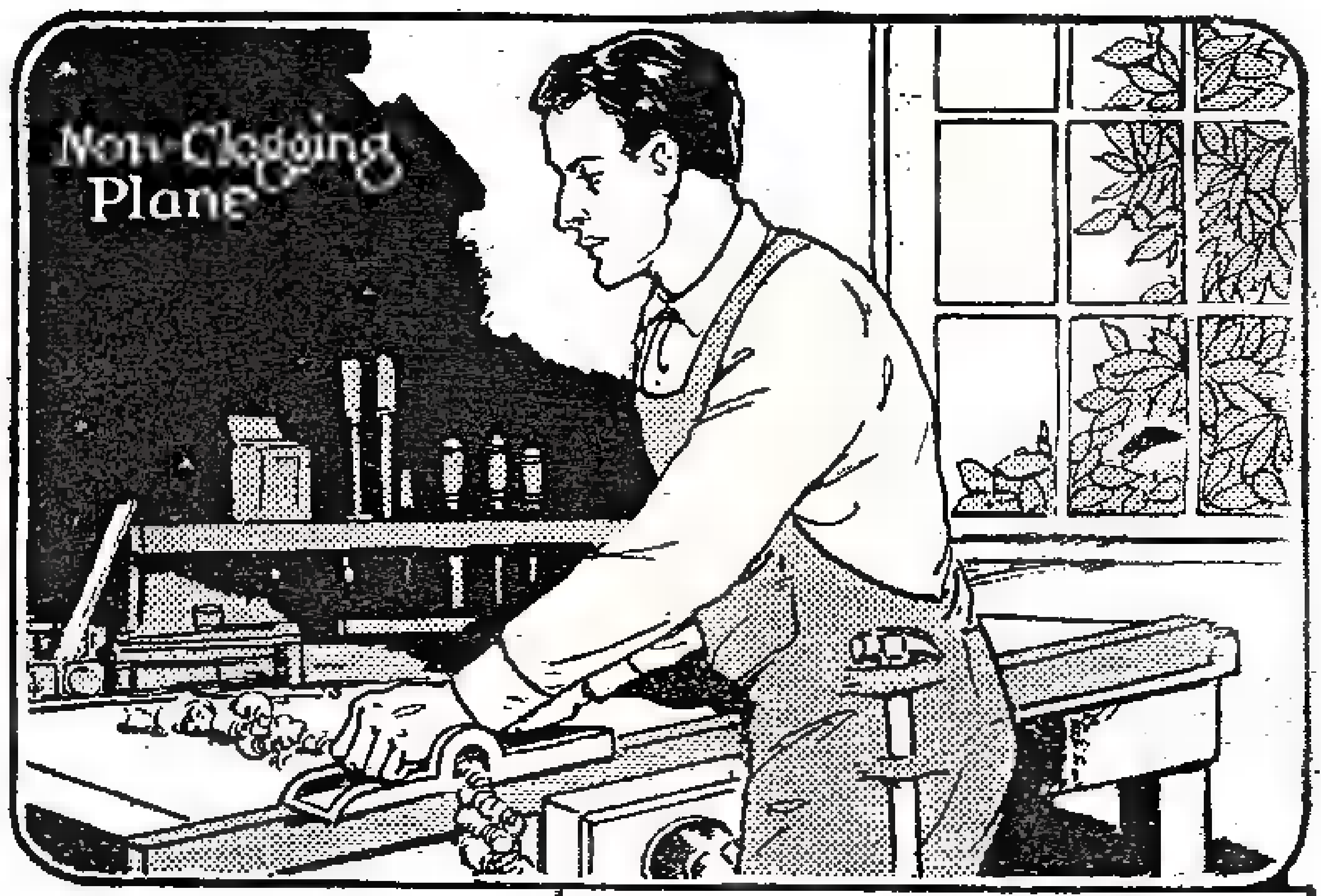
THE cork float shown in the drawing and photograph below rises when the liquid being poured into the bottle approaches the top, and by lifting the wire indicator gives warning to the operator. The gauge is simply constructed according to the diagram, a cross-piece of tin being used to support it inside the funnel.



Fortunes Waiting for Inventions



Workshop fans will welcome a hack-saw extensible in a vertical direction, permitting cuts into work 8 or more in. deep.



Chips have an annoying way of clogging in a plane, necessitating removal of the blade. Device is needed to cure this.

by RAYMOND F. YATES

Editor's note: Mr. Yates, the nationally known patent expert who conducts this department, will answer questions of readers desiring advice on how to secure patents, or methods of procedure, or on ideas for inventions, when such requests are accompanied by a stamped, self-addressed envelope. Never send models, as they will not be accepted. Address Mr. Yates care of Modern Mechanix and Inventions, 529 South 7th Street, Minneapolis, Minn.

1. Double Expansion Hack-saw

MEN with inventive talent use tools and yet few of them are conscious of the shortcomings of many of the tools that they use every day. Take the ordinary hack-saw as an example.

How many times have we as mechanics tried to saw through a piece of sheet metal only to find that the capacity of the saw in the vertical dimension would not accommodate the work?

Why in the name of common sense then do we not have a saw that will saw deeper? It should be adjustable so that it can take eight, ten and twelve inch blades and be made to saw at least from eight to ten inches into the work.

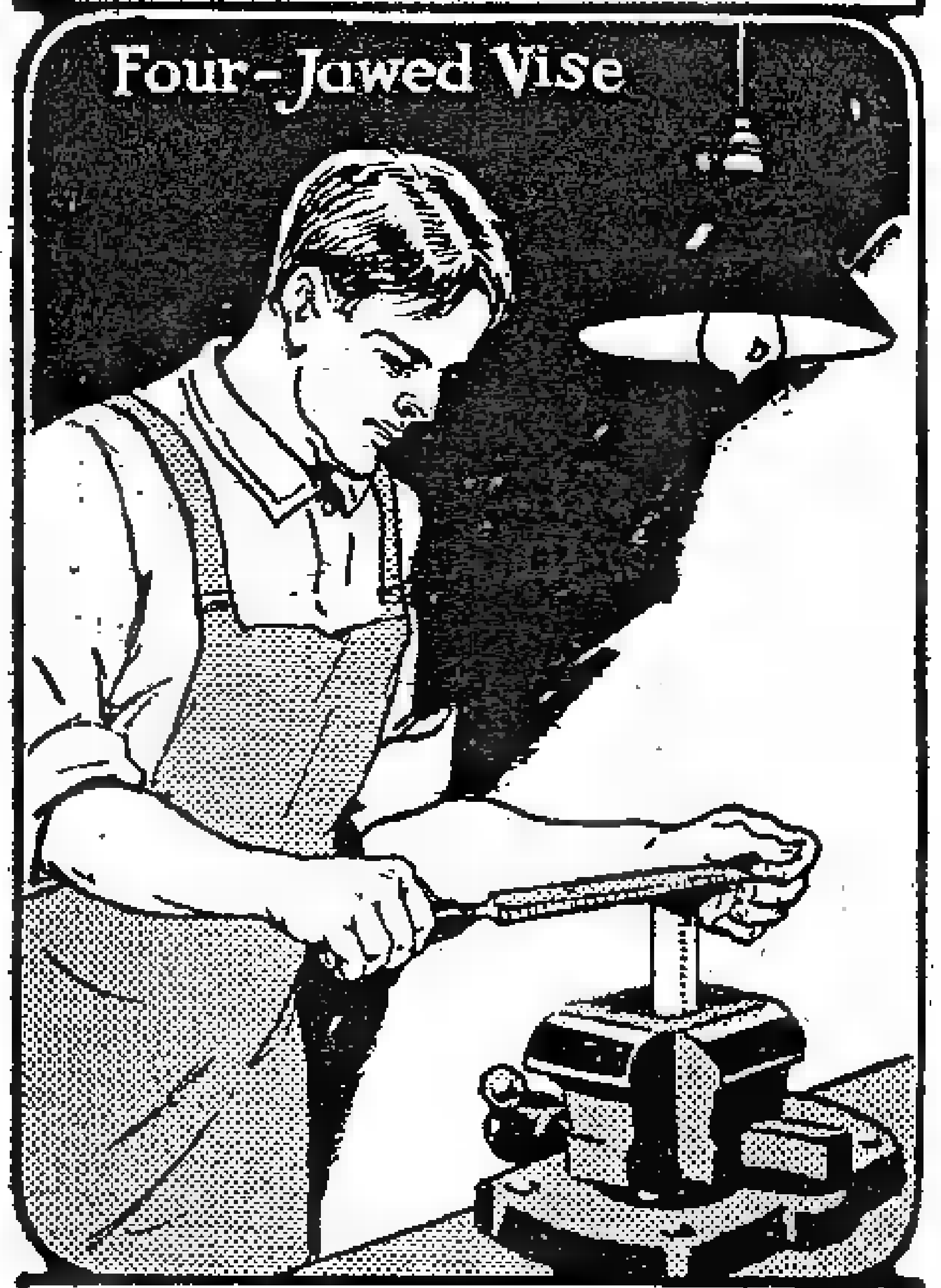
Exploitation: Here again, a royalty form of exploitation should be used for the simple reason that we are dealing with an important tool that enjoys a wide sale at all times.

2. Vise With a 4-sided grip

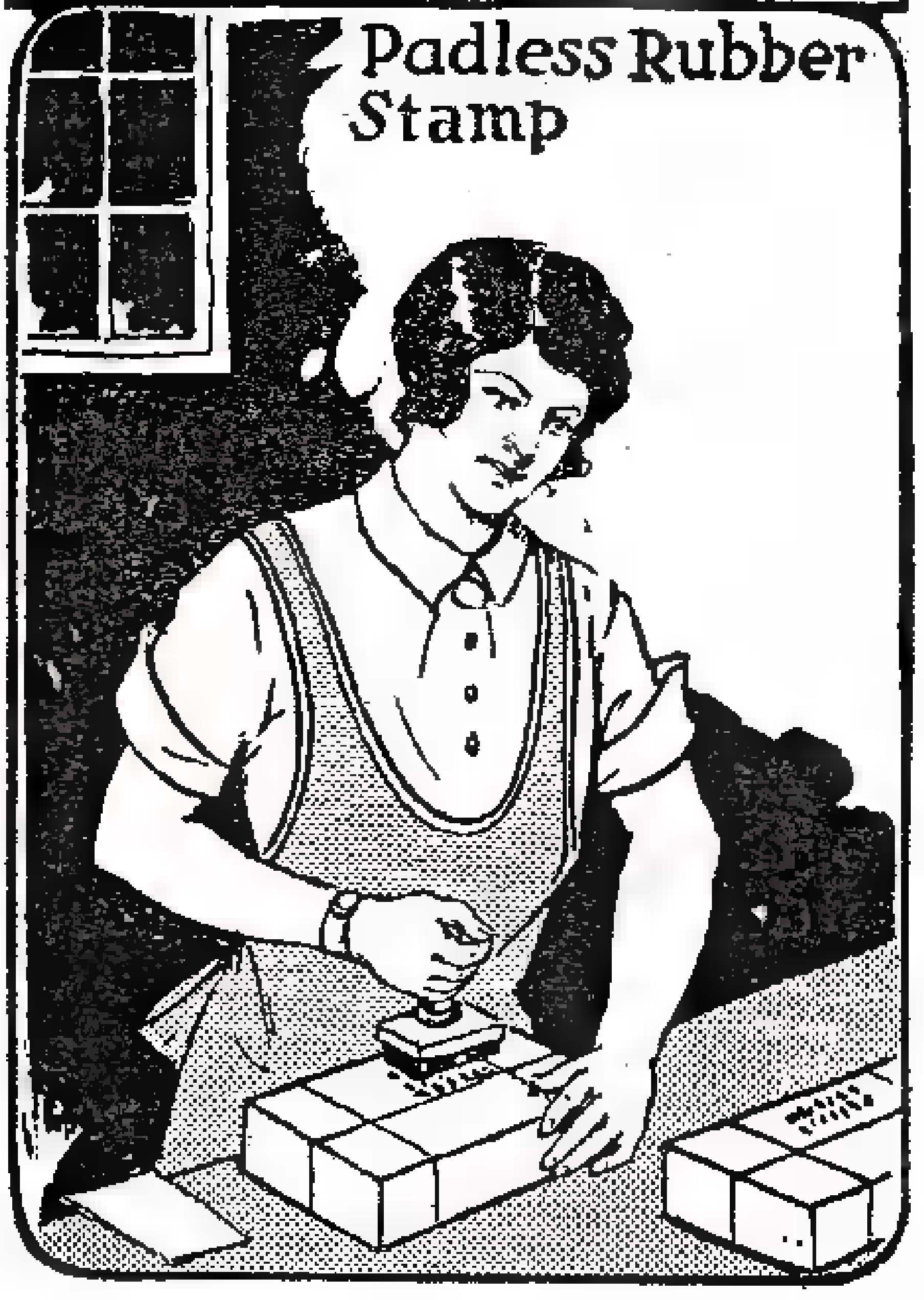
We have all had occasion to grip an article in a vise for a certain operation where the article could not take a hard pinching.

There are many industrial operations carried on where the same holds true and what is needed is a vise that will have four

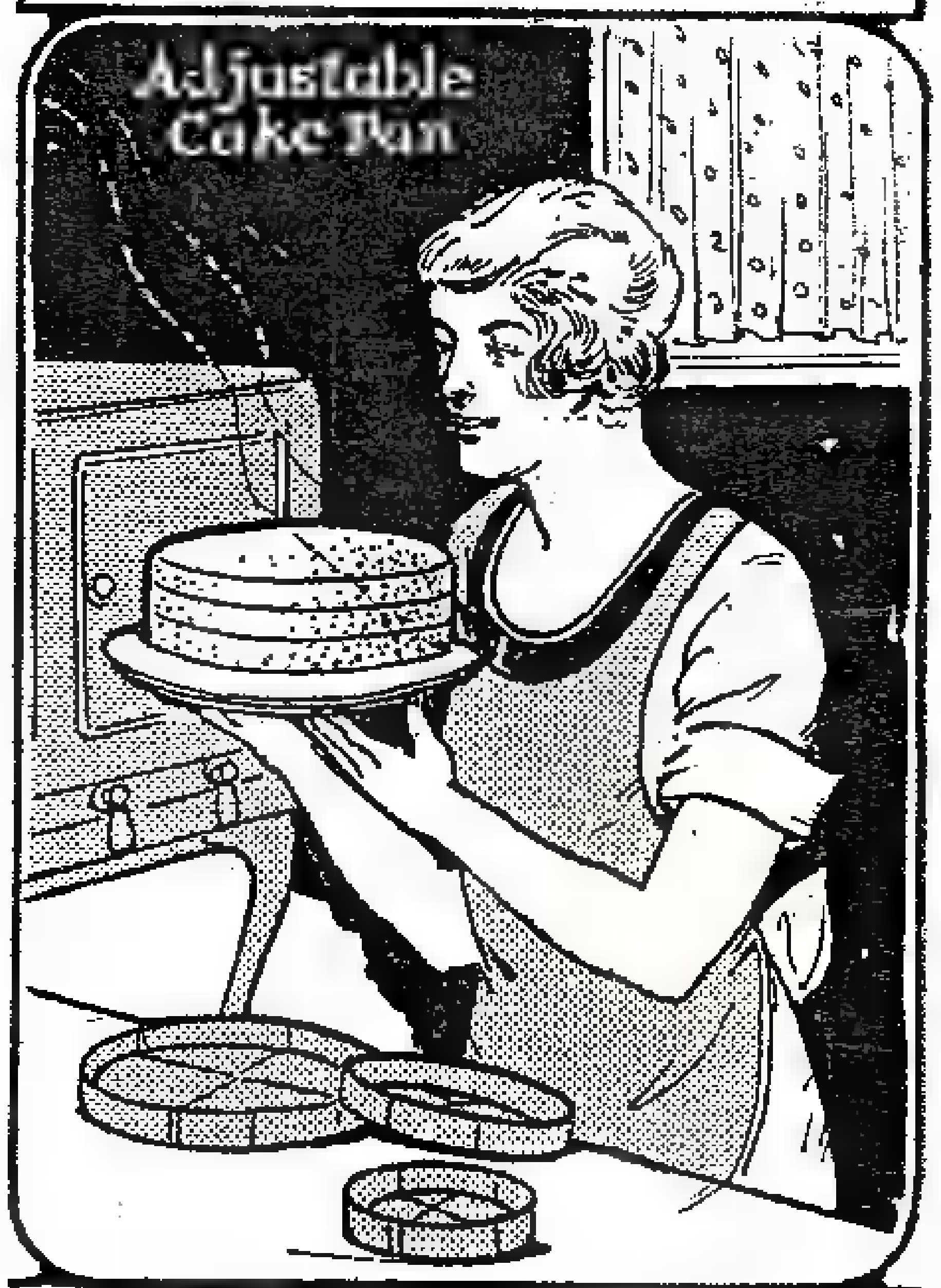
(Continued on page 144)



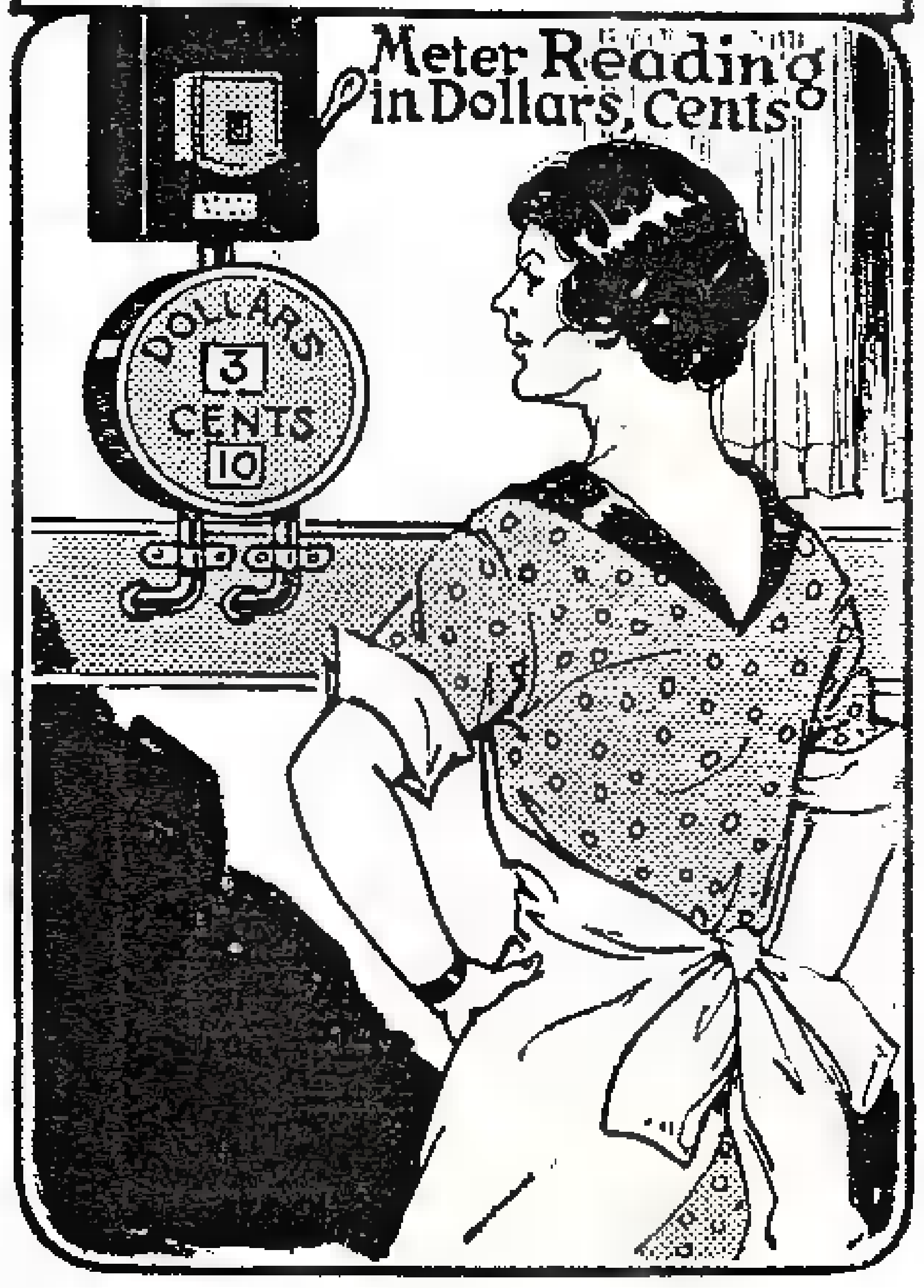
Work having freak or irregular shape won't "stay put" in an ordinary vise. Such work calls for development of a 4-jawed holder.



Self inking pad is demanded by firms that do heavy stamping. Pad and stamp can be combined into single unit. Letters may be porous to absorb ink.



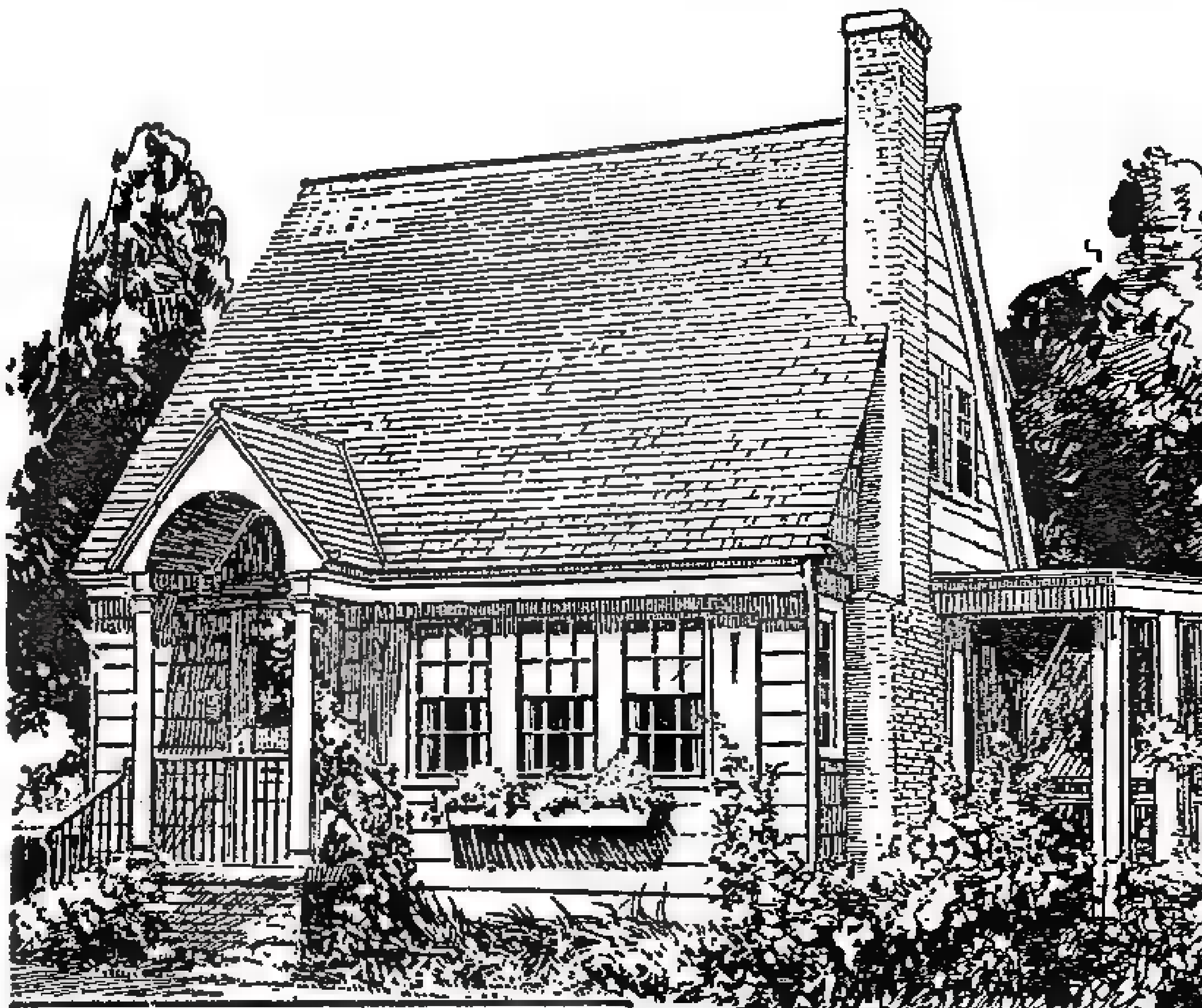
An adjustable pan for baking various sized cakes will save immense space in the kitchen cabinet and win rewards for inventor.

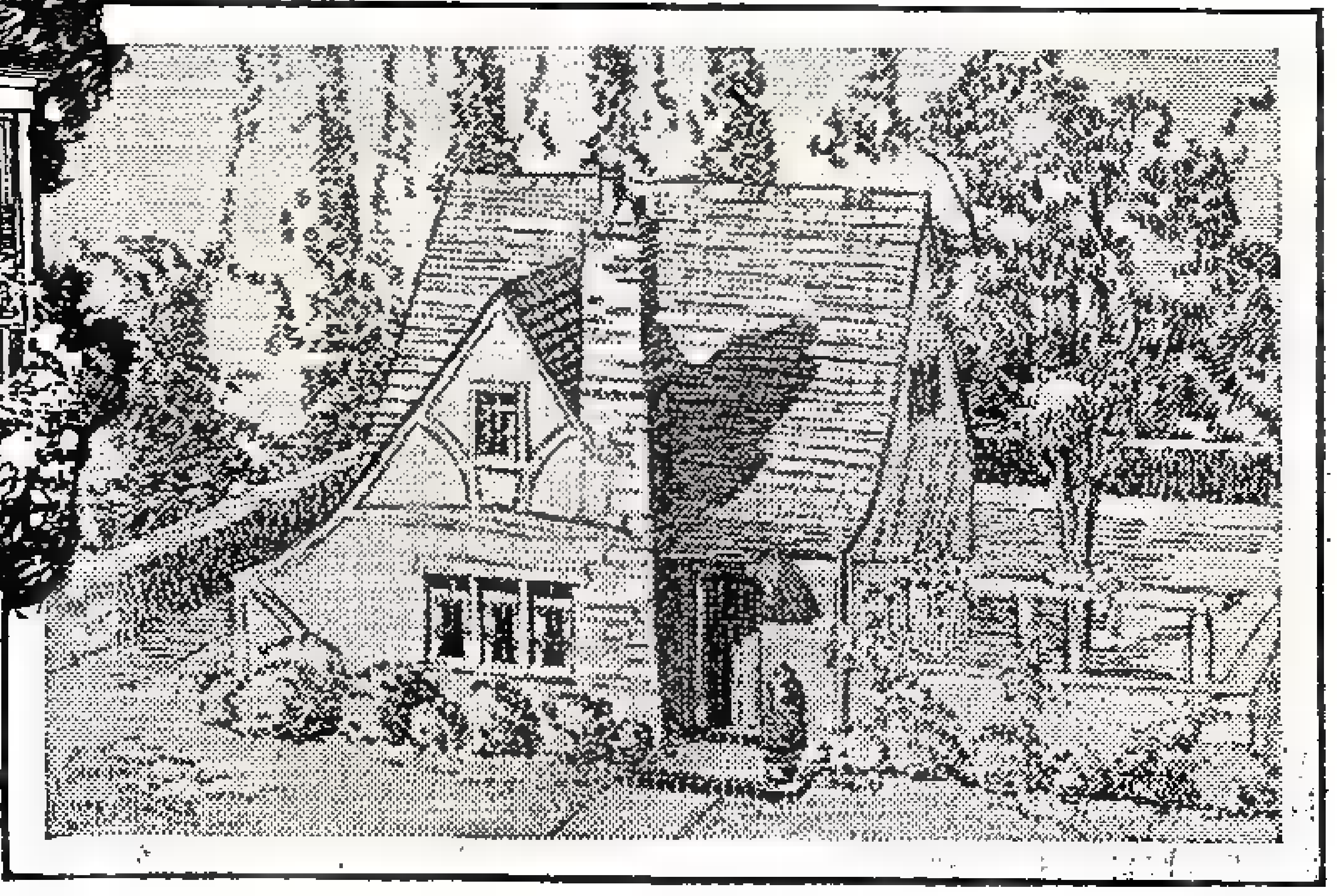

Meter Reading in Dollars, Cents
DOLLARS
3
CENTS
10

With an electric meter reading in dollars and cents the housewife can tell how much "juice" she's using and cut down bill. Will also save bookkeeping at electric company.

If Your Purse is Lean, build a Tabloid House

For complete blueprints of houses illustrated on this page send $1.00 to Modern Mechanix Home Building Editors, 529 So. 7th Street, Minneapolis, Minn. Two new plan books, "Homes for Newlyweds," containing 32 of latest ideas for low cost homes in all styles, and "16 Selected Homes for Lean Purses," containing time, space and labor saving bungalows, may be had for 15c each, or both for 25c, from MM Home Building Editors.





Above is seen house No. 5-W-8, tabloid type, of two stories. Right—Home No. 4-G-30, English cottage style.

SPRING and the home building urge are right around the corner. The urge for many is like an old fashioned tug of war. One side pulls furiously on the heart strings, the other pulls hopefully on the purse strings. It's a tough job to declare both sides winners.

Most people want more house than they can pay for. Many plunge into debt and mortgage their incomes for years to come in order to "keep up with the Joneses." But this is a different year. Houses will be smaller for at least two reasons. First: Dollars are fewer. Second: Folks have found out that a big house not only requires heavy overhead expense but it also consumes time of the housewife.

Therefore the spring building period ahead will see more and more tabloid type houses erected. Small, almost miniature mansions, fully equipped with modern conveniences, stylish to the n-th degree. All of which seems to be a logical answer to our housing needs these days of depression.

I have selected two tabloid type plans as suggestions for those who may now be searching for ideas that point the way toward inexpensive fulfillment of the home building urge.

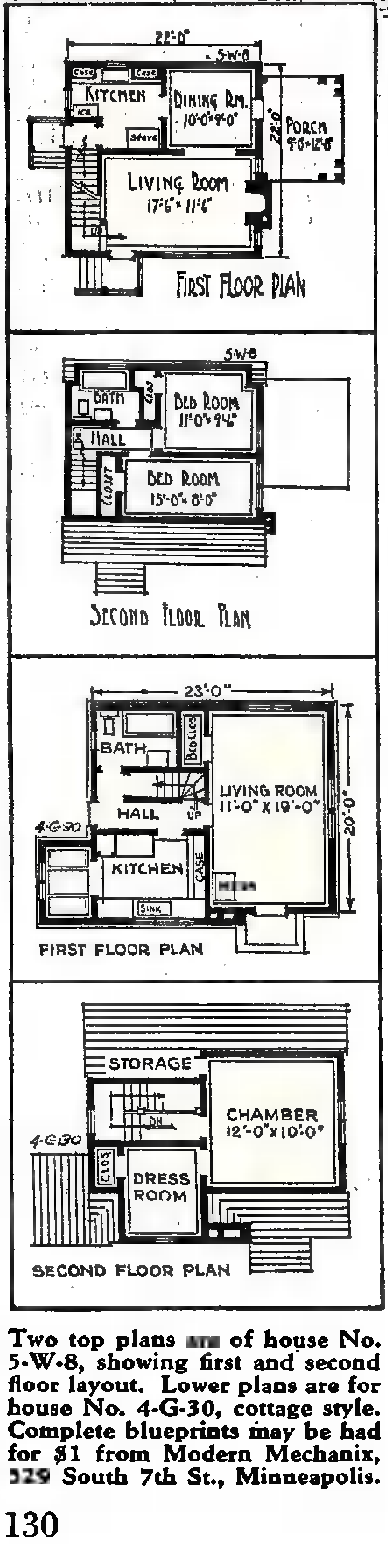
For example, Plan 4-G-30 is hardly larger than a small city kitchenette apartment. Yet here you have it as a detached dwelling and on the rear of your lot. Live in it for a while or until you want a larger house, then convert it into a two car garage. That's the way it has been planned.

As it stands you have a living room, with first floor heater, a kitchen with dining alcove, a bath room and also bed closet on the first floor. There's also a good size dressing room and clothes closet on the second floor. The house has no cellar.

The style is English cottage, the exterior stucco on metal lath, the roof shingles, and the chimney shows inserts of field stone. This adds color and variety to the design. According to the designer this job complete should be in the $2500 price range.

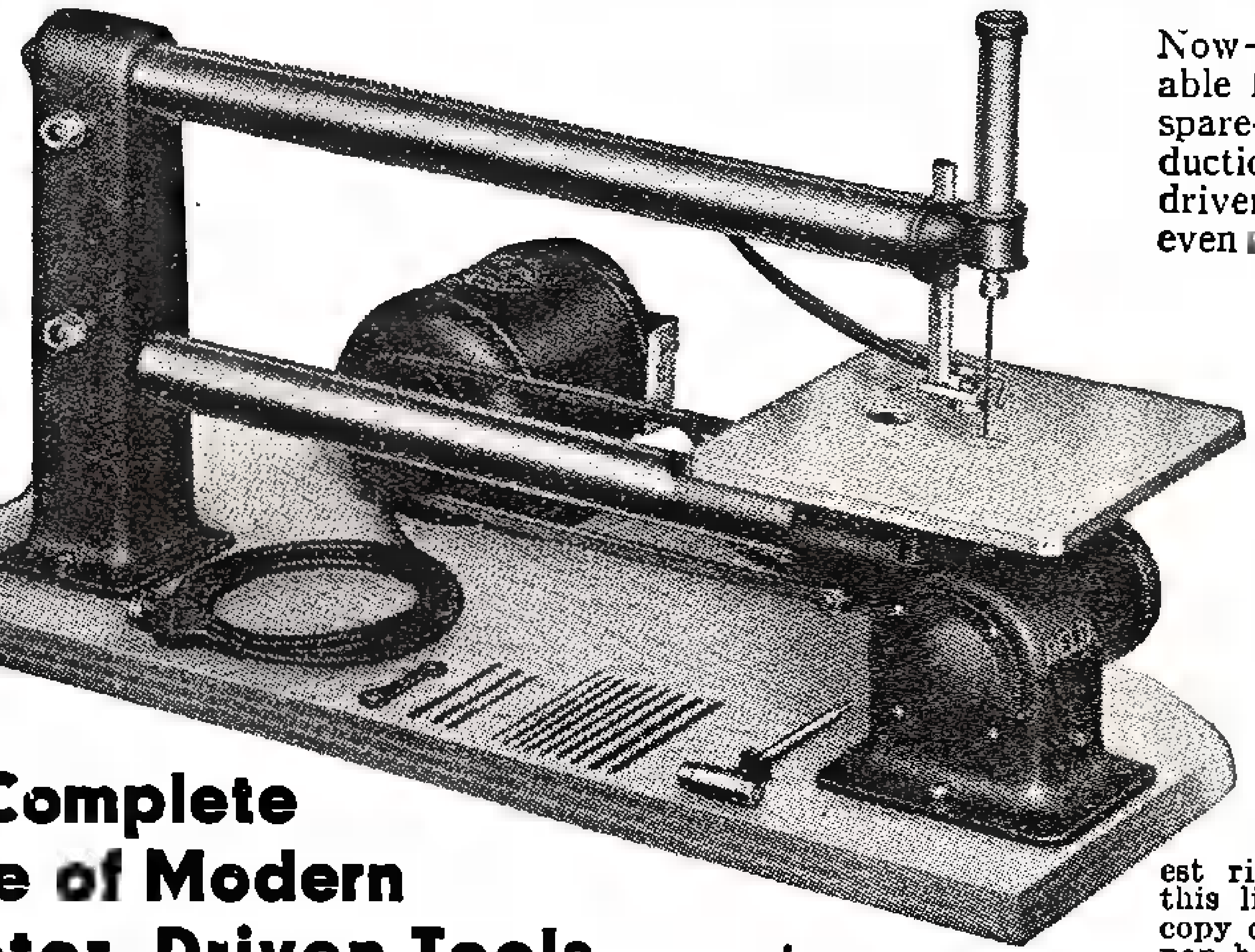
Plan No. 5-W-8 illustrates a tabloid type but of two stories. In other words it is a somewhat larger house than the garage apartment 4-G-30 and offers two bedrooms on the second floor. There's a full basement, and a porch which may be screened or open. A feature of this house is the large living room and open staircase leading to the second floor.

The style is Colonial; the plans call for stock patterns throughout, which means a decided saving. The construction is wood, siding and shingle roof. Price range: $3500 to $5000.



Two top plans are of house No. 5-W-8, showing first and second floor layout. Lower plans are for house No. 4-G-30, cottage style. Complete blueprints may be had for $1 from Modern Mechanix, 529 South 7th St., Minneapolis.

New Motor-Driven Tools
Have Revolutionized Woodworking!



Now—efficient, low-priced "Delta" Tools are available for all those who work with wood for hobby, spare-time money making, or in actual factory production. Compact, practical, sturdy—these motor-driven tools save time, money and labor, and enable even a beginner to turn out professional quality work.

New "DELTA" SCROLL SAW

New and radically different from any Scroll Saw on the market. At 1,800 strokes per minute the "Delta" Scroll Saw has such perfect balance, such absence of vibration, that a pencil can be stood on end on the saw table without tipping over. This is the only Scroll Saw of this type on the market today that can pass this rigid test. Produces smooth, accurate work. Has many special features. The New "Delta" Scroll Saw can also be used for filing, sanding, and honing.

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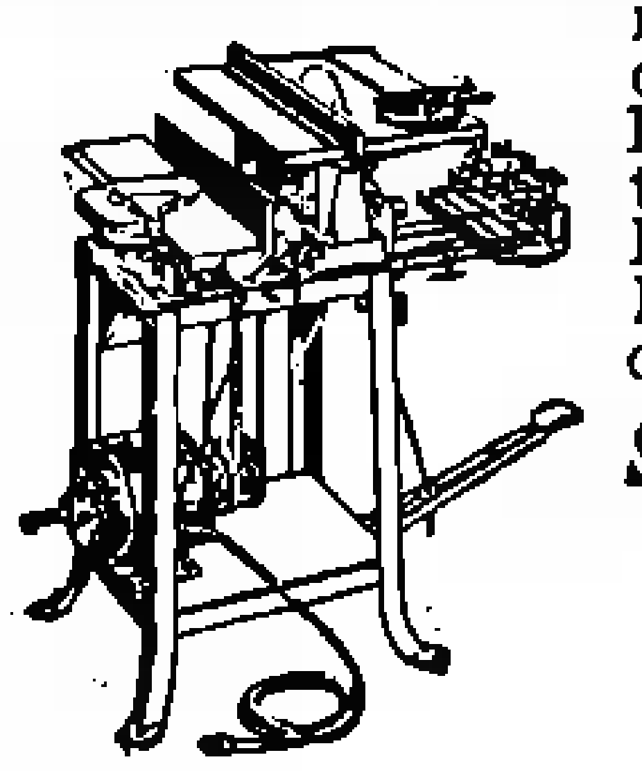
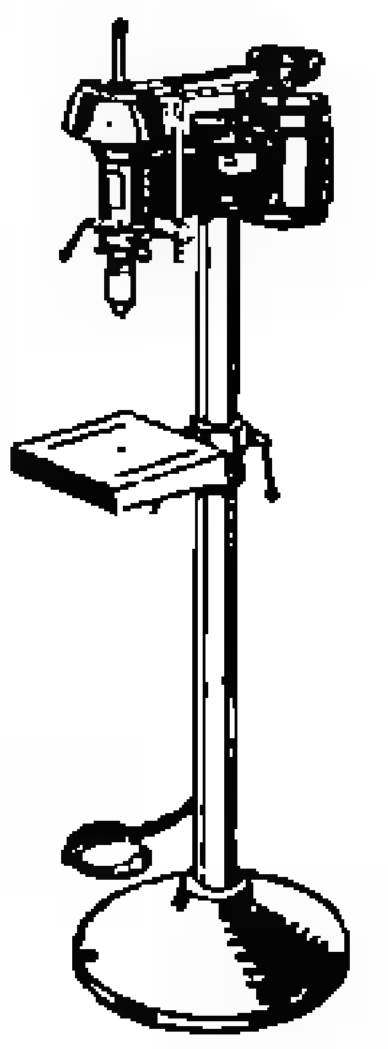


"Delta" Woodworking Units are available in a large variety of combinations, and at prices to fit all needs. The "Delta" line includes Jointers, Circular Saws, Band Saws, Scroll Saws, Wood-turning Lathes, Drill Presses, Boring, Routing, Sanding, and Mortising Attachments, and a complete line of accessories.



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Address...
City...State....................

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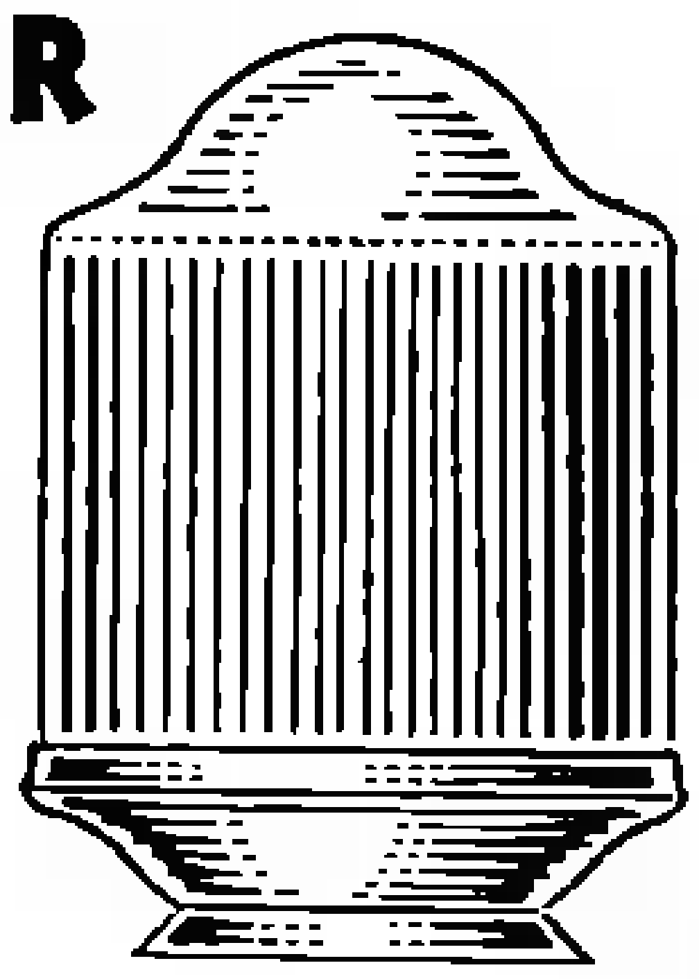

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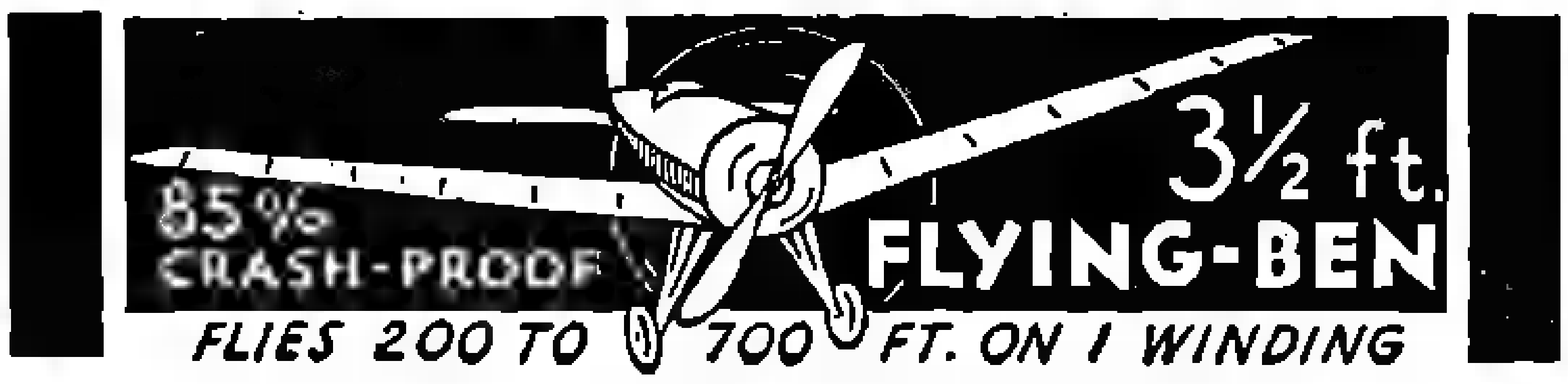

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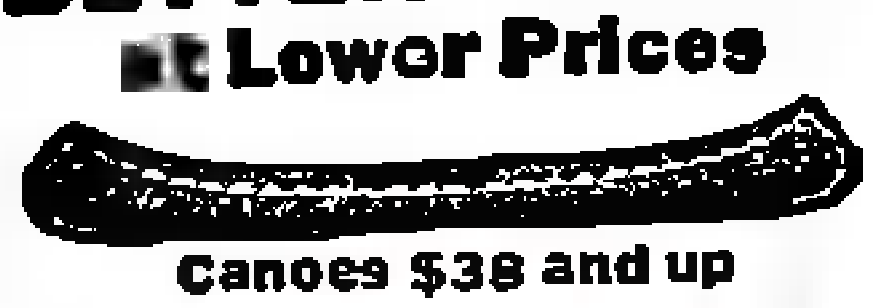

Canoes $38 and up

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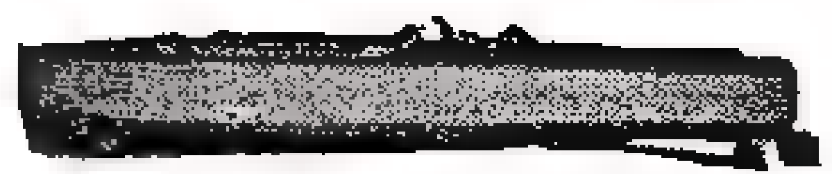

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Please state kind of boat in which you are interested.

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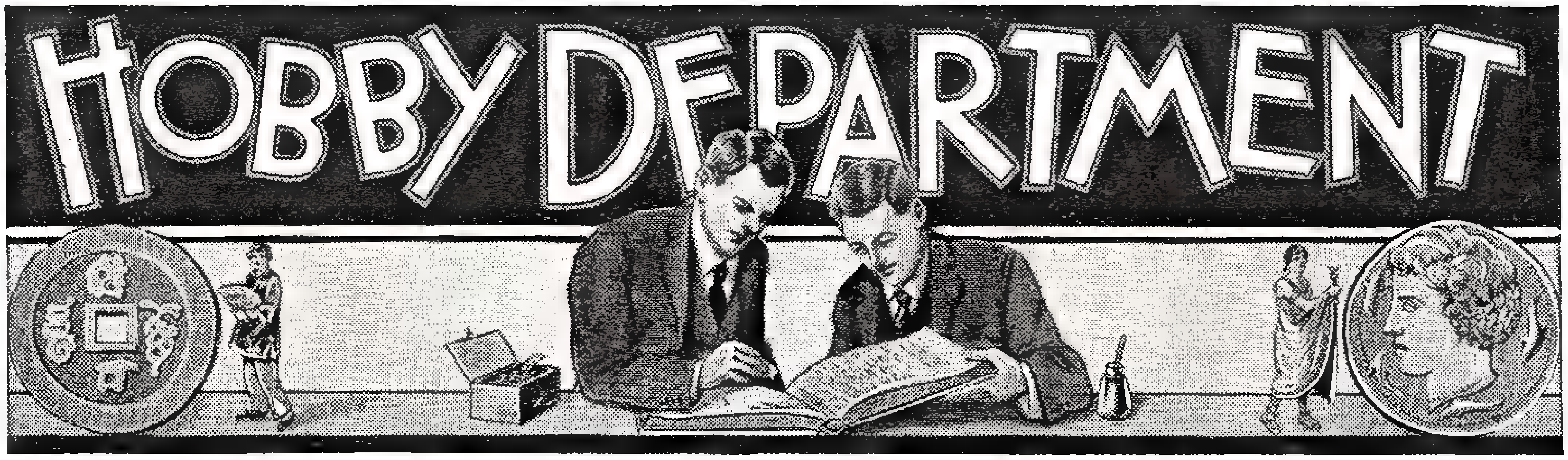


Take a Few Wooden Nickels, They Bring Premium Prices

WE HAVE all heard the homely advice of the rustic who warned his son departing on a journey to the city, not to take any wooden nickels. This may have been wise counsel a few years ago, but quite the contrary course is to be recommended today, when wooden nickels are worth considerably more than their face value, and wooden dollars are eagerly sought for by collectors.

The city of Hoquiam, Washington, was the first to issue wooden money, in the form of promises to pay printed on plywood sheets. Recently in redeeming this script currency, the city found itself several thousand dollars to the good because of the quantity of wooden dollars bought up by hobbyists for their collections.

Script money of all sorts is appearing in various parts of the country, and the alert hobbyist will seize the opportunity to collect as many specimens as he can of these "home made" currencies which reflect a financial condition of the country which will some day be analyzed in endless pages of history books.

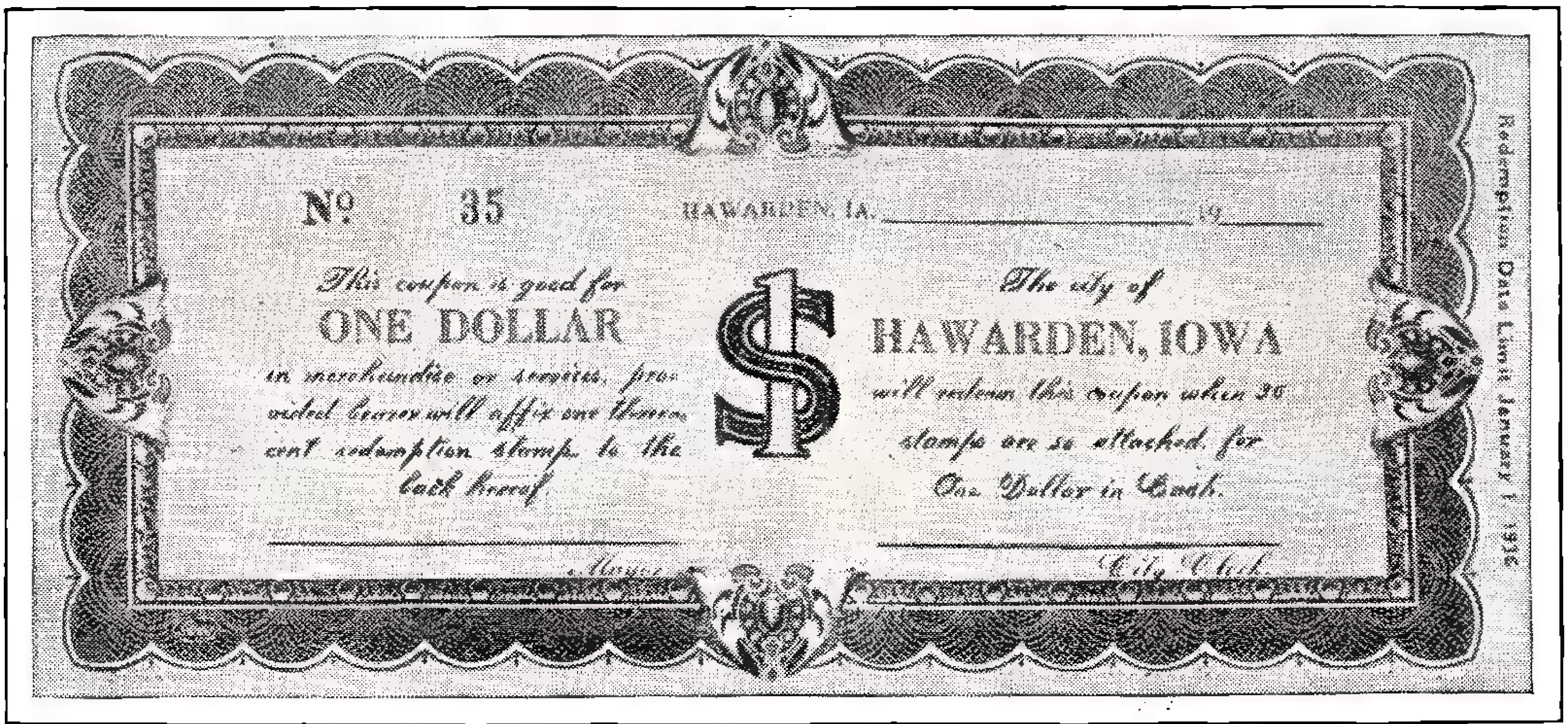
A type of script money now enjoying popularity is illustrated at the bottom of the page. The city of Hawarden, Iowa, gets the credit for originating it. The back of the script dollar contains spaces for affixing 36 stamps, purchased from the city for three cents each. Every time a purchase is made with the script, one of these stamps must be affixed. When the entire 36 are in place, the city exchanges one good American dollar for the bill.

Thus there is a margin of 8 cents which goes to the city to cover costs of printing. Similar schemes are being used in many places, which can be learned by following local newspapers or national news magazines. For collection purposes, a bill to which all stamps have been affixed is preferred. Canceled specimens can usually be secured by writing the local authorities.

New U. S. Stamp Issues

PHILATELISTS are interested in the forthcoming issue of a three-cent stamp commemorating the two-hundredth anniversary of the founding of Georgia. A design bearing a portrait of Gen. James Oglethorpe, Georgia's founder, is being prepared. A memorial issue in honor of Calvin Coolidge is expected shortly, probably in the three-cent denomination, but printed in black instead of the usual purple. This follows the precedent established after the death of President Harding.

(Continued on page 134)



No. 35 HAWARDEN, IA. ____________ 19____

This coupon is good for
ONE DOLLAR
in merchandise or services, provided bearer will affix one three-cent redemption stamp to the back hereof.

$1

The city of
HAWARDEN, IOWA
will redeem this coupon when 36 stamps are so attached for One Dollar in Cash.

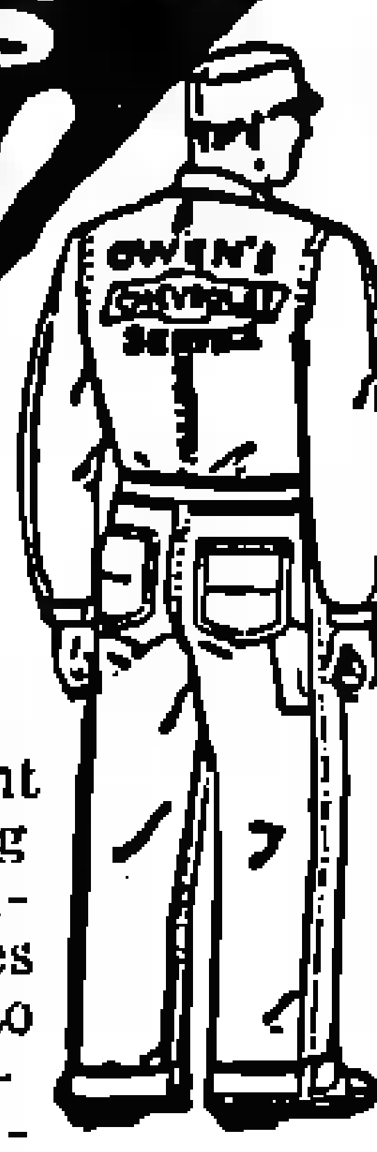
____________ Mayor

____________ City Clerk.

Redemption Date Limit January 1 1936

This specimen is a sample of the stamp system of script currency gaining popularity as a depression remedy. Many hobbyists are collecting wood money and other freak currencies which reflect the times we are now living through.

This Money Making Business Is Yours FREE!



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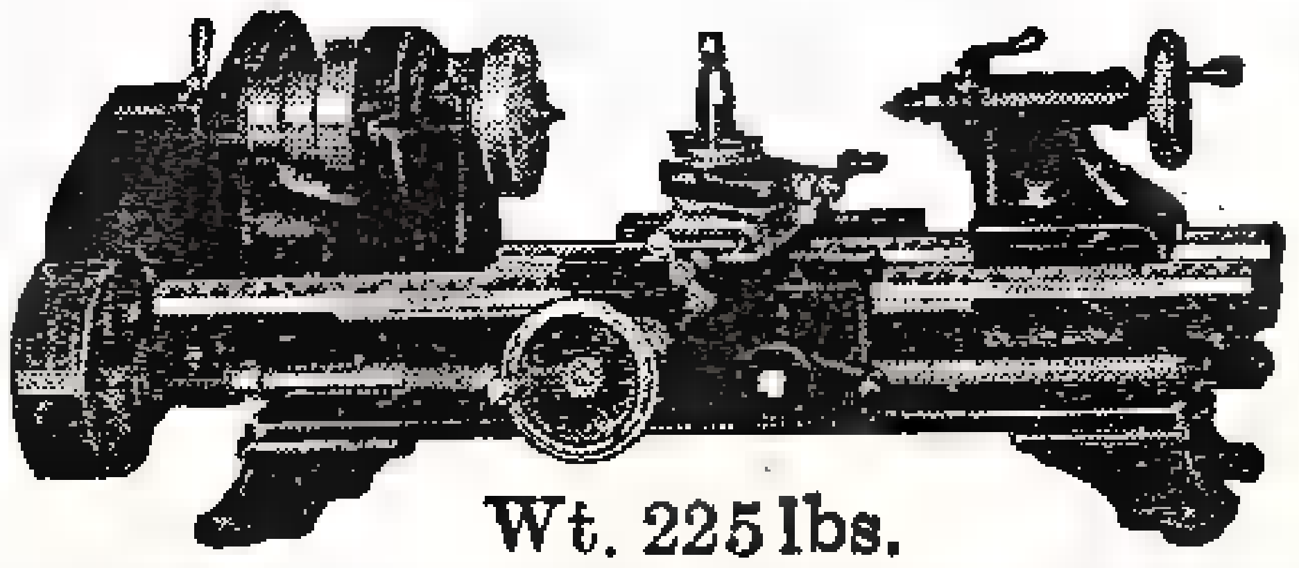
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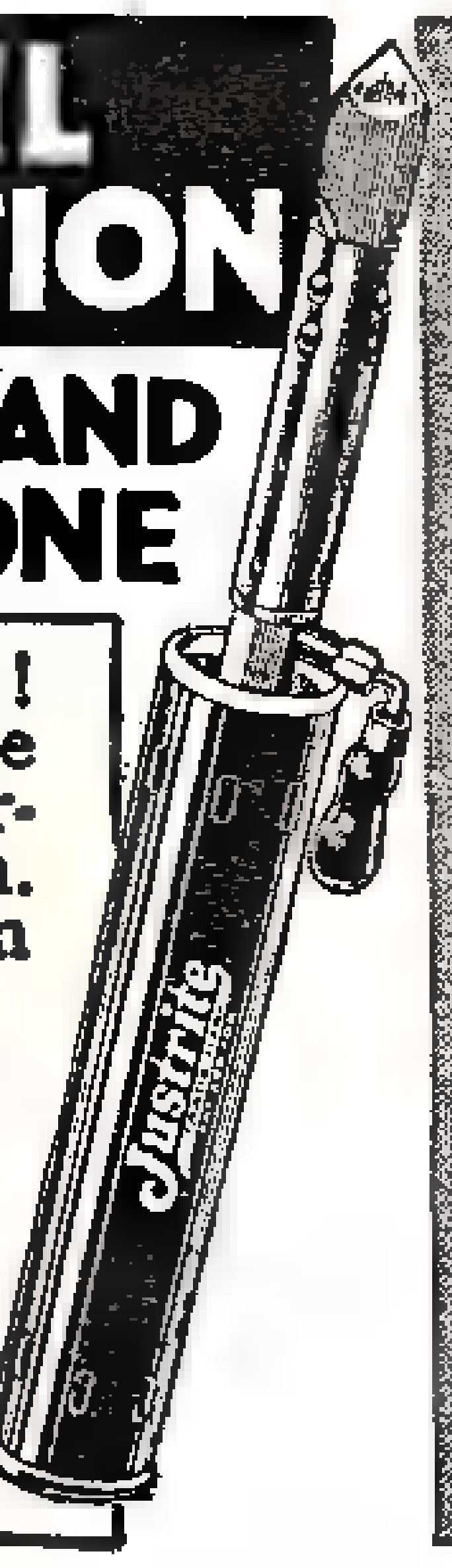

Pays for itself in one job! Needs no pump or pressure system—no stove—no charcoal—no separate blow torch. Burns an hour at less than ¼ cent for gasoline.

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FIND GOLD With Guggenheim Gold Detectors NEVER FAILS

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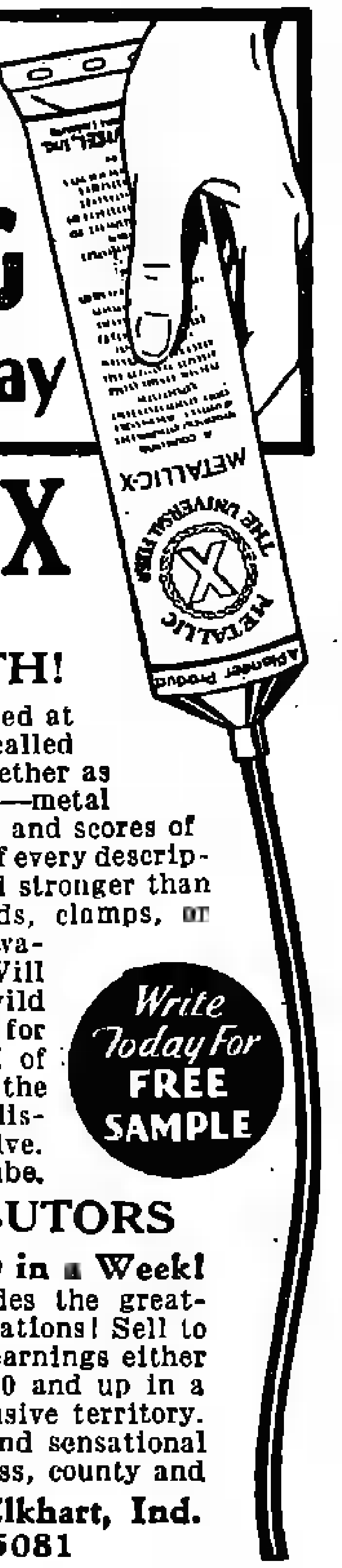

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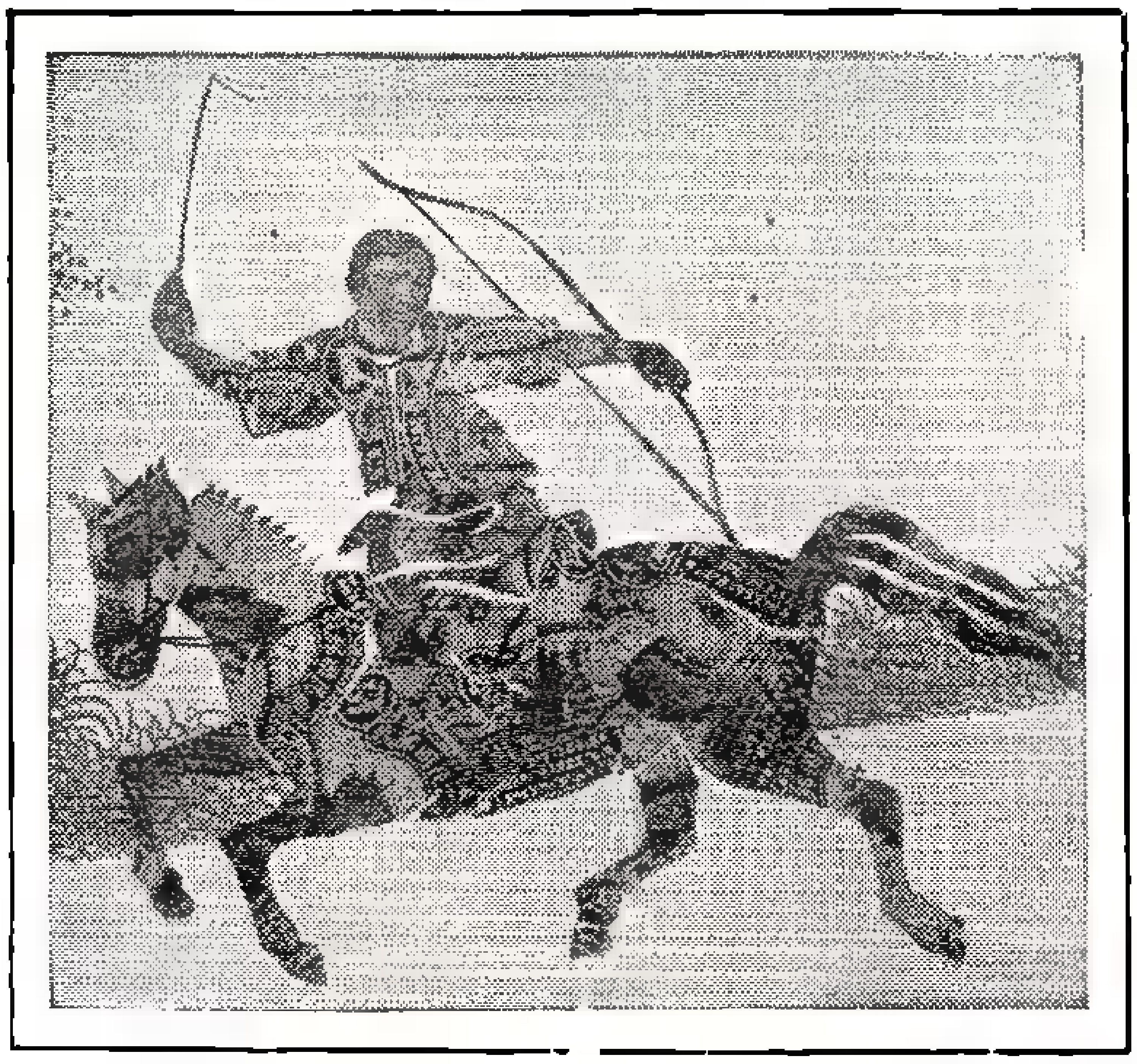
(Continued from page 132)



Postage Stamp Pictures

HERE'S an idea for the stamp collector who has many duplicates in his files which he doesn't know what to do with. With a little artistic talent, striking stamp pictures like the one reproduced above can be created, building up the pattern out of appropriately colored issues. The picture does not do justice to the original, because the cleverly blended hues can not be shown.

The face of the archer is that of Simon Bolivar, taken from a South American issue. Portions of the stamps are cut to shape with scissors or razor blade and fitted together like a mosaic. Tracings made from printed pictures make it simple for the beginner to attain creditable results.

Coins on the Platinum Standard

IN these days when we hear so much about countries going off the gold standard, it is interesting to note that Russia deserted the platinum standard some 90 years ago. The rare coin reproduced here is a Russian 12-ruble piece coined out of platinum! These coins were issued from 1828 to 1844, before the value of the metal was realized. Face value of the coin shown was about $6 when issued, but today the platinum in it is worth $130, and as a rare coin it is valued considerably above this figure by collectors. Russia is the only country ever to coin money from platinum. The 12-ruble piece is about the size of an American half-dollar, though a trifle thicker and much heavier. In appearance the metal is white, but unmistakably different from silver.

(Continued on page 136)

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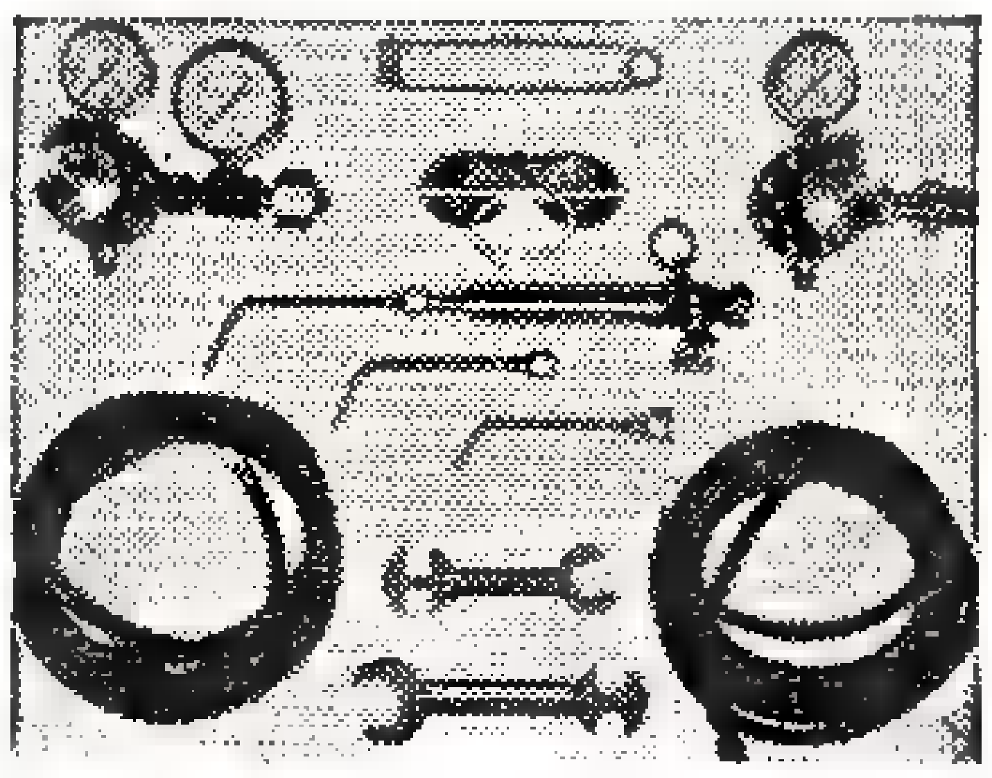

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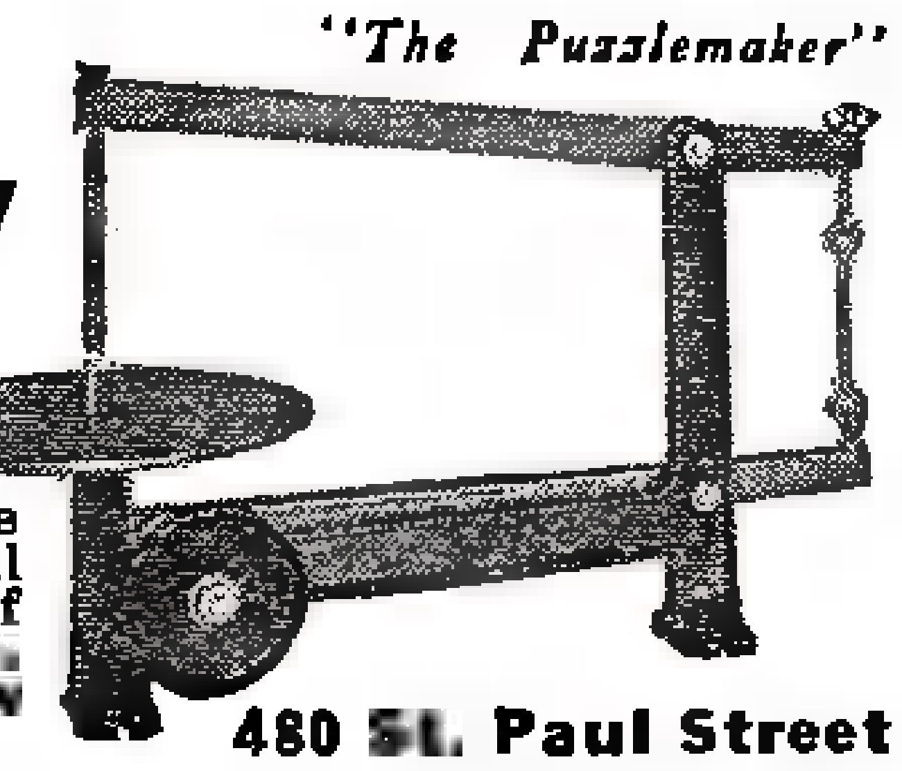

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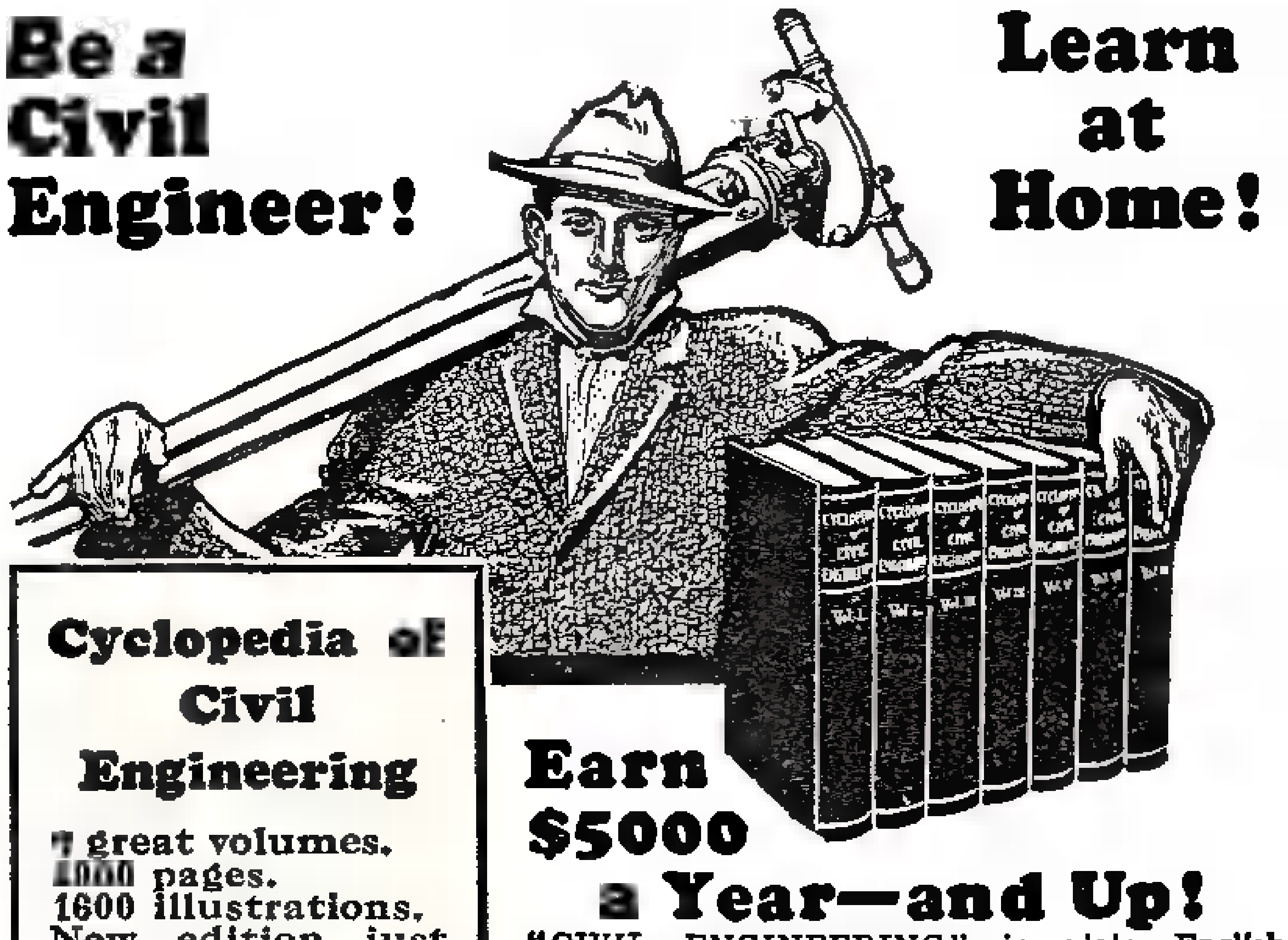

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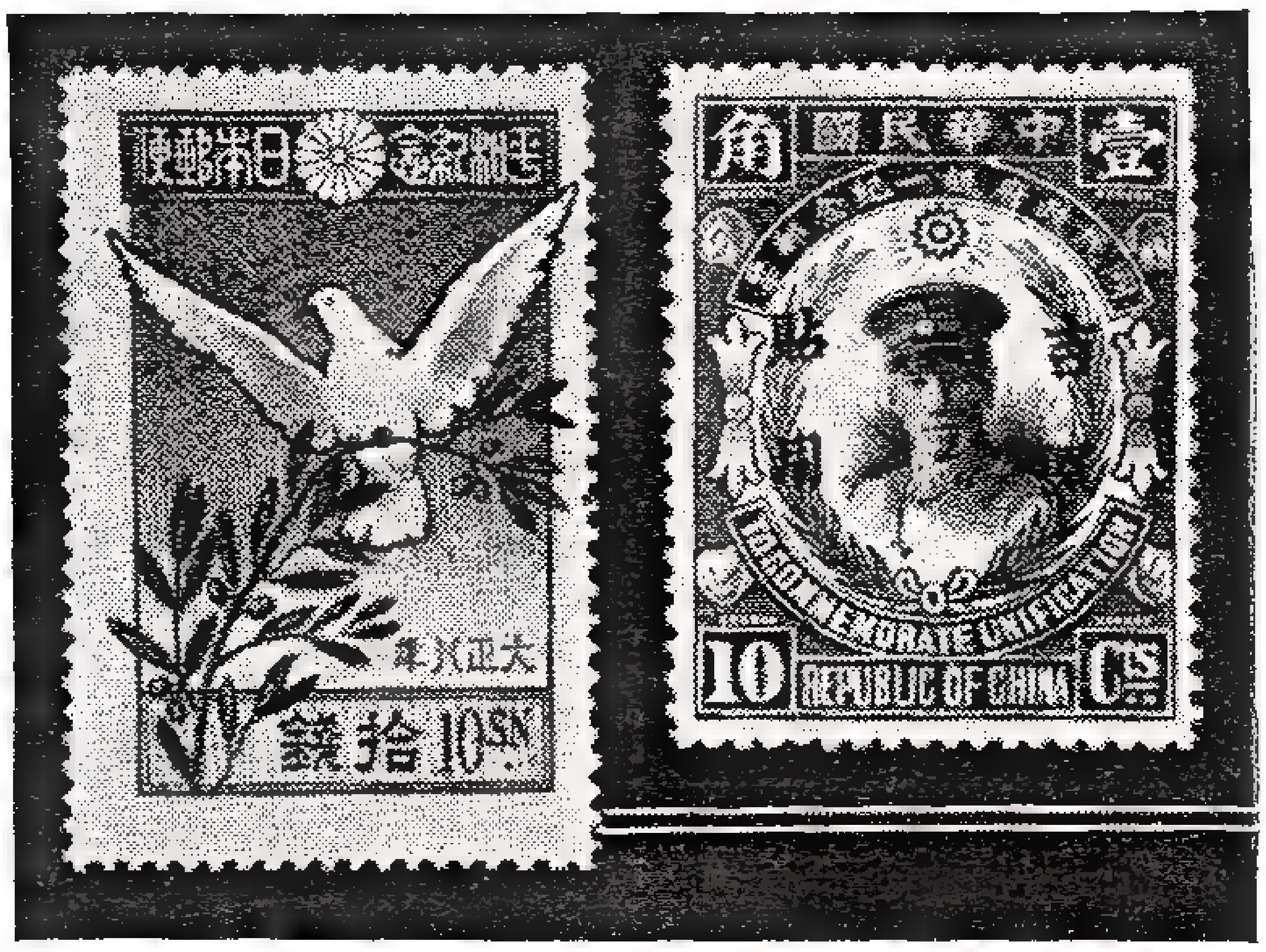
HOBBY DEPARTMENT

(Continued from page 134)

War and Peace in Stamps



WARFARE between Japan and China gives timeliness to the stamp issues of the two countries reproduced above. Although the 10-cent Chinese stamp shown at the right was issued three years ago, it might have been inspired by current news, for the portrait is that of General Chang Kai Check, adversary of the Japanese.

The stamp showing a dove of peace on an olive branch is Japanese, issued in 1919 to commemorate the end of the World War. Millions of Nipponese, groaning under tremendous tax burdens levied to finance military operations against the Chinese, would no doubt welcome the occasion for issuing a new peace stamp signifying the conclusion of current hostilities.

Explanation of Nick Sprank's Oddities of Science

The 64 and 65-square rectangle puzzle is a real brain twister to explain if you don't know the secret. Apparently you have got something from nothing, a manifest impossibility. The secret lies in the fact that, if the pieces in the 65-square rectangle were perfectly cut and squarely assembled, a thin open sliver representing the equivalent of the extra square would be left along diagonal line.

Steel mill workers who know the trick can dip their fingers into boiling iron, whose temperature is 3000 degrees, with no serious results. The iron is so hot that the injection of a comparatively cool finger causes a protective crust to form.

Casual study of any work on biology will disclose many instances in which germs are essential to human life. A familiar instance is the presence of germ life in milk, which makes possible the production of cheese and buttermilk.

Since a plumb line is perpendicular to a tangent of the earth's surface, the sides of a building coincide with imaginary lines passing through the center of the earth; hence, a rectangular building is wider at the top than the bottom.

If an alcohol flame is placed beneath a container of liquid air, the extreme coldness will freeze particles within hollow interior of flame.

Most birds have crops for grinding up their food; the woodpecker is an exception, possessing a stomach.

New Facts About the Earth

(Continued from page 70)

He takes continuous samples, from the top to the bottom of each well. Then he maps the well, showing the depths at which each species occurs. This enables him to divide the rocks penetrated by the wells into fossil zones, each of which is characterized by distinct groups of the tiny animal remains. By completing this examination of all wells in a single area, he determines the structure of the field.

"No oil has been found in commercial quantities below California in the Jurassic or older rocks," explained Mr. Earl B. Noble, assistant chief geologist of the Union Oil Co. "This represents a period ending about 120,000,000 years ago. However, in Texas, Oklahoma and many other parts of the world oil is obtained from beds many millions of years older than any known oil producing horizon in California.

"We have many bullet-like fossils of the Eocene age, say twenty-million years old. Still others, ammonites, that appear in Cretaceous shale, are in the neighborhood of sixty-five million years old. One particularly fine specimen (see page 69) resembles a curved sea shell. Since ammonites died out completely at the end of Cretaceous time, this specimen, found in a shale core 3500 feet down in northern California, proves unquestionably the well was in Cretaceous shale."

Many other interesting, though less beautiful relics of pre-historic days frequently are found as fossils in cores. Fish scales, sea-urchin spines, and pieces of lignite coal occur in abundance while shark teeth, crab claws, worm borings and even fossilized fish sometimes reach the microscope. Even ripple marks, mud cracks, rain marks in what once was mud, often are so well preserved as to be easily recognized.

With uncanny accuracy drillers bore down through prehistoric sea floors in their quest for oil. The "finger prints" of nature enable them to locate definite rock layers and oil-bearing sands. These layers are measured throughout a field with reference to sea level. Then, in drilling a new well, the geologist need only reveal to the crew the distance they must drill to reach the top of the oil sand.

The cores tell many strange facts about the earth's crust. Most beds originally were laid down practically horizontal, yet throughout the world cores reveal some formations to have tilted.

Some cores in California tell of beds composed almost entirely of the remains of skeletons of diatoms, tiny microscopic organisms that flourished abundantly 12,000,000 years ago. Some of these beds are several thousand feet thick. How did they supply oil?

"Recent studies made on diatoms that live in certain parts of our oceans today," said Mr. Noble, "show that these organisms secrete tiny drops of oil which they apparently use in supporting life. However, if conditions are such that the diatom is destroyed before it has lived its full span of life, these droplets of oil are released. When a living diatom comes in contact with fresh water it literally explodes. Perhaps this is what happened to millions upon millions of these tiny fellows in the ancient Miocene sea."

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Scientific Detective Lessons

(Continued from page 53)

stoop to pass through. Microscopic examination of the top of the door opening reveals that someone did not stoop low enough. A hair clings to the wood, left there as someone bumped his head. That a bump did sever the hair from the head is proved by the fact that the end of the hair which led down toward the scalp is bruised and crushed through, not cut cleanly.

The hair is medium brown. Its cross-section is nearly round. From a member of the Caucasian race, then. Hair varies according to race in its cross-sectional shapes.

The hair is rugged, from a healthy head, and, very likely, a robust man. Its age rings show its owner to be between 36 and 38 years old. Science can now determine the age of a man within two or three years by the spacings between the cuticular scales or age rings covering a single hair.

Further examination of the victim reveals a tiny scratch on his wrist. Apparently he sought to strike his attacker, who parried the blow with a hand, accidentally scraping the inventor's wrist with one of his fingernails.

From this little wound is taken a microscopic lump of what is known to the laboratory as "fingernail scrapings," the foreign matter that clings beneath even the cleanest nails. Imbedded in this grime are infinitesimal steel filings and grease.

The man sent to the laundries returns. He has learned that the handkerchief mark was given to, say, Henry DuPrey, who lives at 221 West Oak St.

With the information he has gained from his fingernail scrapings and the single hair from the door, the laboratory investigator gets in touch with the driver who handles DuPrey's laundry. He tells him:

"I am hunting a man about 36 to 38 years old. He has medium brown hair, probably light blue eyes and fair complexion. His beard or moustache, if he has either, should be sandy. He is about five feet six inches tall. (He knows a shorter man would not have bumped that door top, a taller one would not have struck it just where the hair was found, but above that point.)

"This man is rather careless of his appearance.

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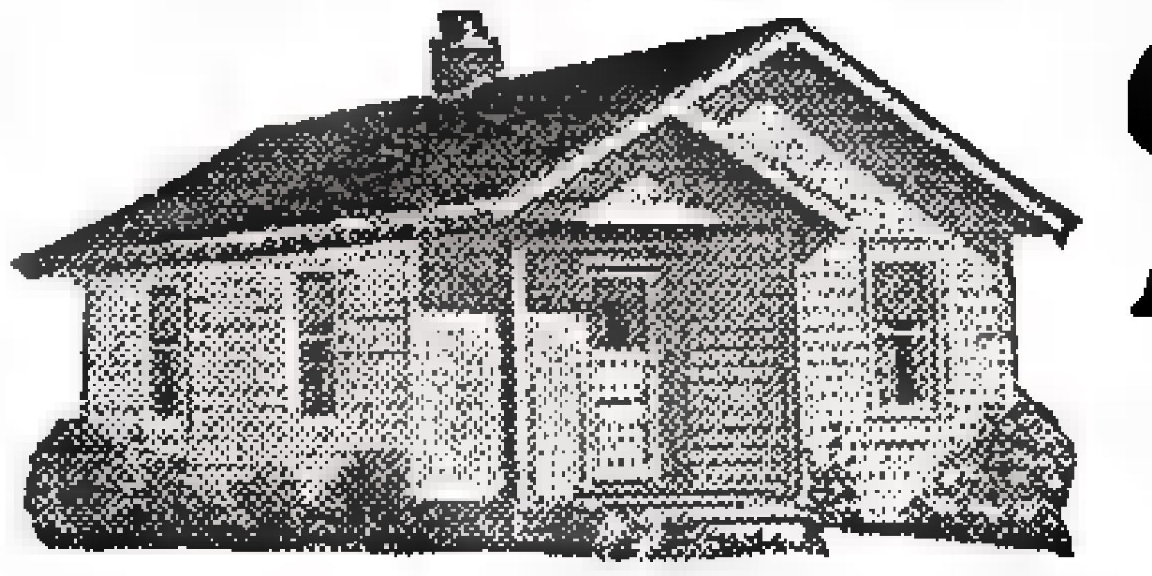

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29x4.75-20	2.25	0.98
29x5.00-19	2.60	1.08
30x5.00-20	2.60	1.08
28x5.25-18	2.65	1.19
29x5.25-19	2.7[illegible]	1.19
30x5.25-20	2.7[illegible]	1.19
31x5.25-[illegible]	2.9[illegible]	1.19
28x5.50-18	2.9[illegible]	1.19
29x5.50-19	2.9[illegible]	1.19
30x6.00-18	2.9[illegible]	1.19
31x6.00-[illegible]	2.[illegible]	1.19
32x6.00-20	3.[illegible]	1.29
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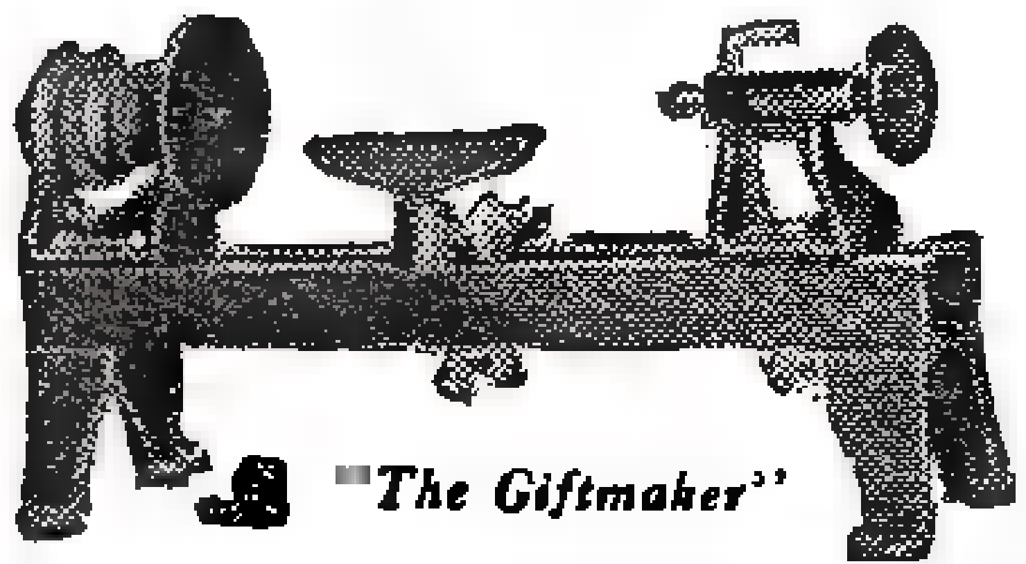

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Probably wears his clothes unpressed and in disarray. (Slovenly about his nails, whoever left that scraping in the scratch on the victim's wrist probably would be slovenly about his attire as well.) Very likely this man is an engineer or mechanic. (This is indicated by the fact that steel filings and grease were found *in combination* in the nail scrapings; either an engineer or a mechanic would have an opportunity to pick these up *together* in his daily work.)

"Would this Henry DuPrey fit my description?" He has described DuPrey almost to the life.

DuPrey is arrested. He denies any knowledge of the crime. But under one nail is a tiny particle of human skin. Under the microscope it matches in texture that of the slain inventor's wrists. The gun, through its restored numbers, is traced to the prisoner. The handkerchief is his. The evidence is conclusive already.

There remains the handwriting on the death note. Though DuPrey had sought to disguise it, this too is identified as his. Handwriting identification is a simple matter to the scientist, and certain.

Search of DuPrey's home reveals plans for an invention. He insists these are his own.

The ultra violet ray and the microscope disclose on these plans infinitesimal dots, which are identified in chemical analysis as paint. Examinaton of plans in the closet cabinet at the inventor's home reveals exactly similar dots on many of them. Next door is an automobile paint shop, where finishes are applied with an air brush. Atomized paint has drifted on air currents from this shop, through a little ventilating window in the closet and so onto the papers in the cabinet. Thus it is established that the plans found in DuPrey's possession did at one time rest in the inventor's cabinet.

Subjected to a test by the "lie detector," a device for testing emotional reactions, DuPrey shows evidences of strain as he denies the crime. Further questioning is in order.

Under this, and faced with the growing mass of evidence against him, he confesses.

Tracking Down Mountain Gorilla

(Continued from page 58)

days of gorilla travel. Their trail was consistently along the ground—animals of all sizes mounted stumps, logs and leaning trees, but the youngest of intermediate size seemed to frequent the trees more than did the smallest or largest members of the group.

One of the most surprising discoveries about gorillas was that they are amazingly fearless in going down perilous descents. On the other side of a 10,000 foot ridge, in some places where slippery paths seemed impossible to traverse, down the beasts had gone, actually sliding along chutes made by the terrific contact of their bodies with the mud and rocks. There were few roots or bushes to cling to, and the earth and bare cliffs showed where they had tobogganed to the bottom.

Besides feeding on bamboo shoots, the gorilla is especially fond of wild celery. This plant, which attains a height of six or eight feet, grows luxuriously throughout the region.

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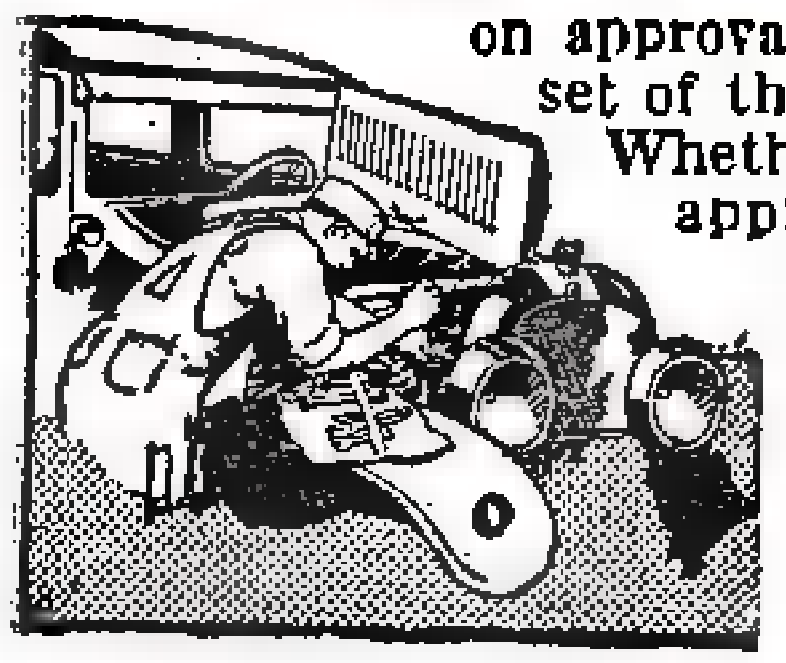

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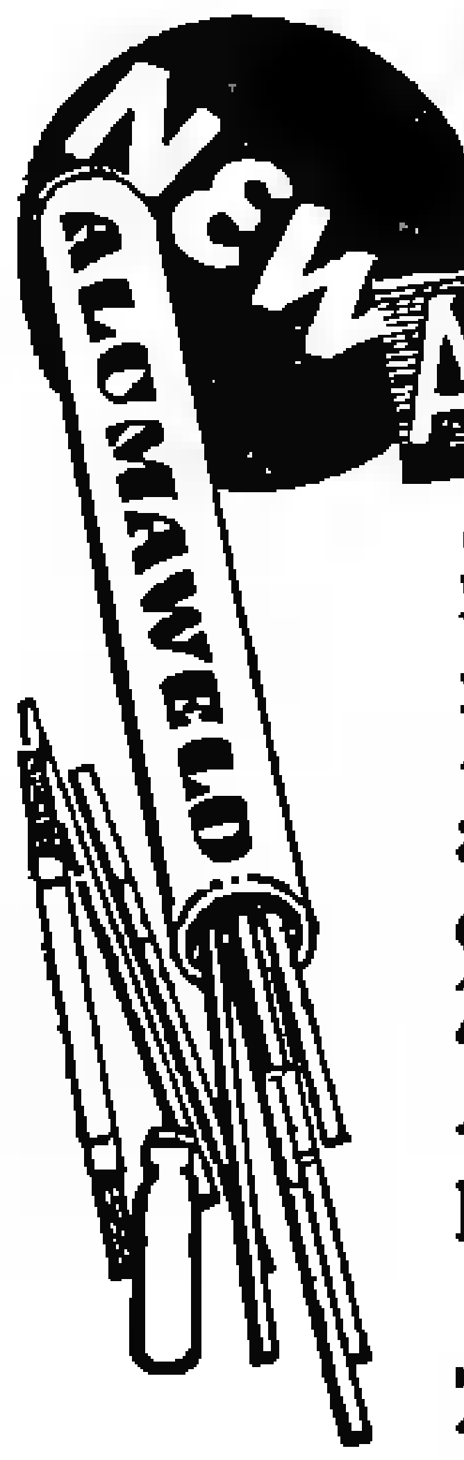

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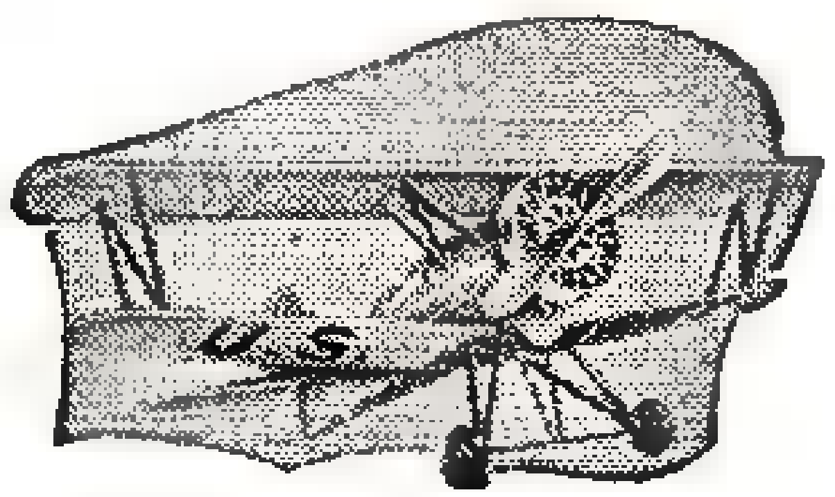

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A Sun Dial That's Different

(Continued from page 120)

These dimensions are good only if the "indicator" on the gnomon is exactly 1" from the dial surface. The lines of the scale for the equation of time correction are in line with the minute dots above them. The longitude divisions on the movable brass plate are 15° to 1 hour. The surfaces used for the equation of time correction table should be prepared for lettering by applying white lacquer in the same manner described for the dial surfaces. See Fig. 2.

If you live north of the equator, place the special scales and tables on the north side of the dial surface and support, or on the other side if living south of the equator.

Set the sundial up as follows: (1) Choose a location where there is the greatest duration of sunlight. Face the south side of the dial directly south. See drawing for checking the adjustment. (2) Adjust the angle of the dial surface according to your latitude. The scale begins with zero at top, and runs to 90°. This may also be checked for accuracy by observing the shadows for a few days. (3) Determine from a map how many degrees of longitude east or west of your *standard time meridian* you are located and mark an arrow on the longitude scale accordingly as seen in Fig. 3.

This adjustment for longitude is necessary because the sun is straight south before noon or after depending on your location east or west of the standard time meridian.

If the time indicated by the sundial is found to be incorrect and the shadows move in perfect arcs, as shown on the drawing, the longitude plate may be shifted to make the dial read correctly.

To read time by the sundial, first, note the equation of time correction for the day, second, set that number of minutes (noting plus and minus signs) opposite the arrow on the longitude plate. Then read the time where the shadow of the gnomon falls. That is all there is to it.

The date is determined by observing where the center of the round shadow of the date "indicator" falls. If it falls off the dial, note where the shadow of the rim falls on the lower part of the gnomon.

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ENGINEER DOBE, 1951 Lawrence Ave., Div. 24, CHICAGO

Gold and How to Find It

(*Continued from page 44*)

just above bedrock, in pockets at bedrock, in bars adjacent to the stream, in the "benches" left by prehistoric streams that flowed through this valley or gulch before the present stream cut to its existing level, are the places where placer gold is found, and placer mining offers the small operator the best chance for making a "stake" with small outlay of capital.

The best chance of finding paying placers today is in old bench formations, in old side gulches not thoroughly prospected, in very old stream beds filled in with slides or over-washed junk long before the first miners came and therefore overlooked by the first prospectors, and other alluvials not directly in the present bed of the stream.

In a fairly quiet stretch of the stream, perhaps the upper end of a pool below a little rapids, scoop up a gold pan of gravel. Hold it under the water, washing it around, crushing lumps of clay and gravelly earth until all has "melted," then by a slow, easy circular motion begin to wash the lighter gravel and earth over the edge while the minerals will settle toward the bottom.

Tip the pan about 10 degrees while washing gravel. Whirling it too rapidly or allowing swift water to run into it may wash out gold before it has time to separate out and sift down, because of its heavier specific gravity, to the bottom of the pan.

Pick out rough pebbles, keep filling in new water to wash out the clay, finish with the pan only partly full of water, and washing carefully while tipping more and more to keep the rejected material sluicing over the edge. Pan manipulation is best learned from some old sourdough or the westerner who sells pans usually can show you how it is done; it is hard to describe it exactly.

Often the last residue in the bottom of the pan is mostly "black iron," and in it look for the gold "colors." It may be bronzy or light brass-colored because combined with silver or other mineral. Or it may not be gold at all.

Fool's gold, which is either pyrites of iron or copper, breaks when hammered on iron, while real gold flattens, for it is malleable. Mica, which sometimes is golden in color, is much lighter than gold and flakes rather than flattens when pounded. If the gold particles are rough the point of origin is not far up stream, but if smooth or flaky, they have traveled in water over long distances.

In the last sorting of gravel be sure to look for small pieces of quartz-carrying gold. And if there is some other mineral-type of residue other than the "black iron," it may be copper or some other valuable ore worth more in the long run than gold. But if you get rough gold there is a lode of it up stream.

Now, by following up stream, verifying the colors at regular intervals, you stand a good chance of locating the source of the gold and perhaps values greater than can be found in placers. Not all gold veins are known; not by any means. At some point up gulch you will

(*Continued on page 142*)

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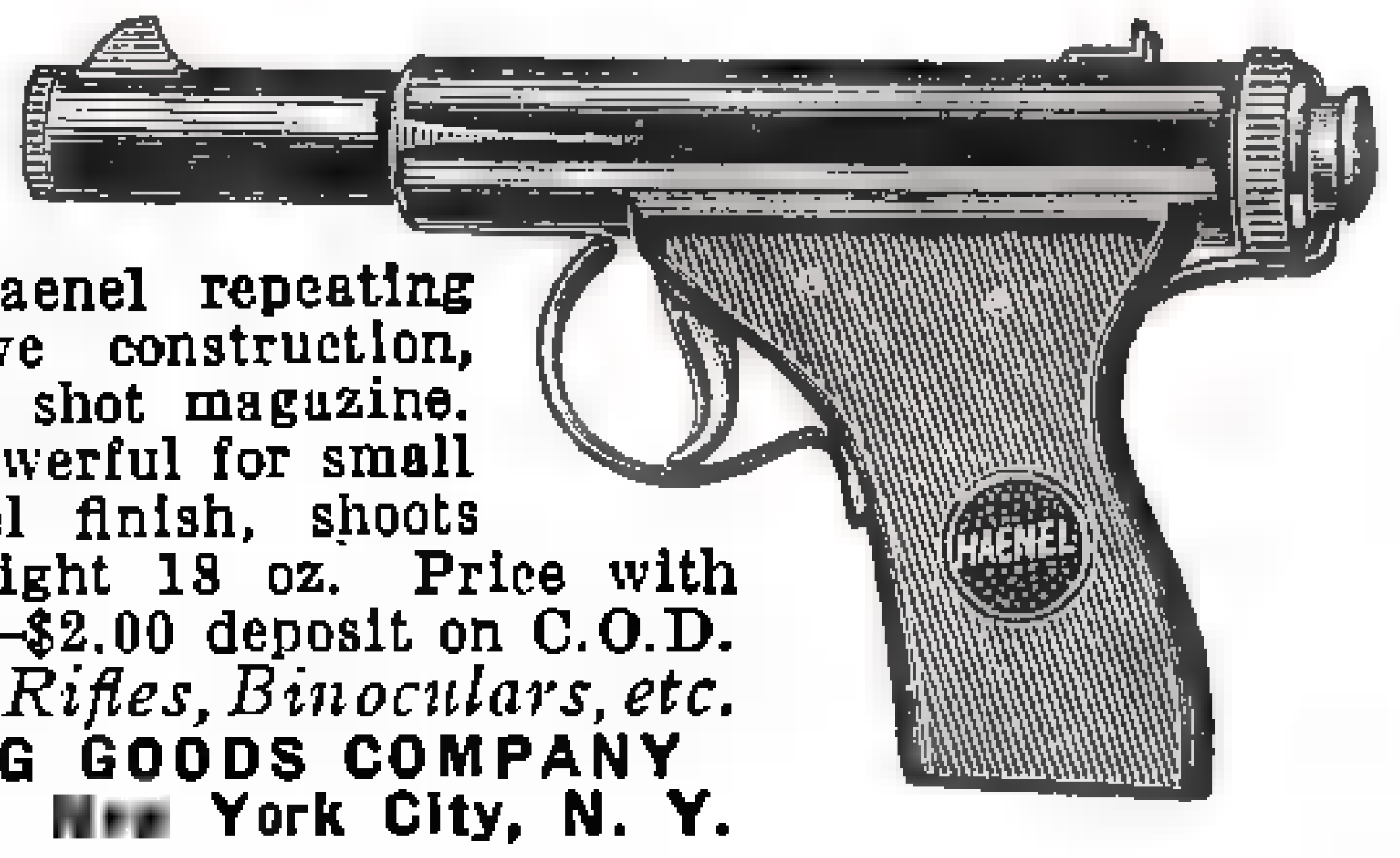

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Gold and How to Find It

(Continued from page 141)

find that the rough gold flakes cease. Just below that you will find the spot at which they appear in the gravels of the stream bed.

On one slope or the other up from this point must be the point of origin, and by working systematically, sampling ground back and forth across the slopes, and testing it out in the pan, you will trace up the line where disintegrated ores are spilling down the hill. Following up that streak should bring you to the exact point of origin of the gold you have been following.

In the stream beds and adjacent benches the pan locates gold-bearing gravels and earth; by tracing up stream and up slope, still using the pan, grinding the ores in the mortar if necessary before panning, lodes may be found.

Panning alone will not bring good wages in average ground for but half a ton may be washed through in a day. Few placers are left that will run $6 per ton; usually the average about 50c per ton and a hard day's work in such ground would net 25c. For that reason the pan must be considered a tool for making discoveries rather than a means of gathering gold.

We will show later how equipment increases a man's capacity in handling pay dirt carrying values lower than $6 per ton. The first thing, however, is to find the gold, be sure it is there. All this first discussion can hope to do is to get you on the right track and under way.

In our next article we will show the man of limited capital how he can work a placer claim, building most of his own equipment, using ordinary tools and materials.

Plans for Scram

(Continued from page 111)

any slight errors of scaling off the dimensions are multiplied sixteen times on the large drawings. That is why it is necessary to "fair up" in full size before a stick of lumber is cut.

When the profile and the half breadth plan have been faired in, go back and revise the dimensions on the cross sectional plans so that they are in conformity with the lines as you have actually laid them out and faired them up.

That's all for this installment—more next month. Because *Scram* is a man-size boat, the story has to run in three parts. The final installment will give dope on converting Ford motors to marine use. Blueprints give the whole story complete.

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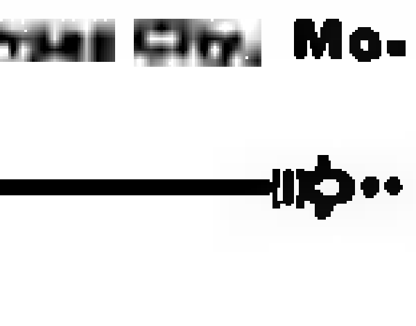

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Thousand Ways to Make a Living

(Continued from page 79)

Fireplace Screens

A SHEET metal worker whose company had been forced to shut down, arranged with them for the use of certain tools and light machinery for a low rental. He then made up a few samples of fireplace screens out of sixteen gauge black sheet iron backed with one-quarter inch mesh twenty gauge screen. These he placed in the department stores, furniture stores, interior decorating shops and the commission shop. Through the contractors he got in touch with people building new homes and solicited the job of designing and making fire screens to match the lighting fixtures or in fact carry out any idea the home owner might have. He built up a small but successful business in this way.

Handy Repair Man

ANY man or boy who is handy with tools can make money by packing an assortment of tools in his bag and calling from door to door. It is a comic strip fact that housewives have difficulty in getting odd jobs done by their menfolk. They will order long planned minor repairs when the worker is right at the door; work such as fixing obstinate doors, balky locks; installing of long needed shelves; repairing the screens and painting them in readiness for spring.

Home Popcorn Factory

YOUNG boys as well as men can make a generous profit by preparing popcorn at home, placing it in sacks and peddling it from covered picnic baskets from door to door in their home neighborhoods. The regular prices are charged and boys often make two dollars in a Saturday afternoon if they are hustlers.

Gift Shop Gardens

IN ANSWER to our present day need of attractive garnishing for our food, as well as the need of economy, an ingenious person painted flower pots with saucers, in attractive color combinations. He made them in pairs (one for each kitchen window) and filled them with rich earth. Included was a packet of parsley seed and directions for growing. These outfits were sold to gift shops, the commission shop as well as by solicitation. They made an instant appeal as the purchaser received not only a decorative but a permanently useful addition to her kitchen, as parsley grows again as it is cut.

Making Statuettes

ONE man with spare time which he wished to turn into money started the manufacture of plaster figures. He covered a statuette with plastic wood, then slit it through the side with a knife blade, inserting a double thickness of waxed paper in the slit to prevent the two shells sticking together. When the plastic wood hardens the two halves of the shell are removed from the statue and bound together. A hole is bored in the top of the combined shells and a small funnel inserted. Plaster of Paris is poured in and allowed to set for three hours. Separate moulds from figure, spray it with bronze paint or varnish, and an exact duplicate of the original figure is secured.

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29x5.00	19	2.60	1.05
30x5.00	20	2.60	1.05
28x5.25	18	2.65	1.15
29x5.25	19	2.75	1.15
30x5.25	20	2.75	1.15
31x5.25	21	2.95	1.15
28x5.50	18	2.95	1.15
29x5.50	19	2.95	1.15
30x6.00	18	2.95	1.15
31x6.00	19	2.95	1.15
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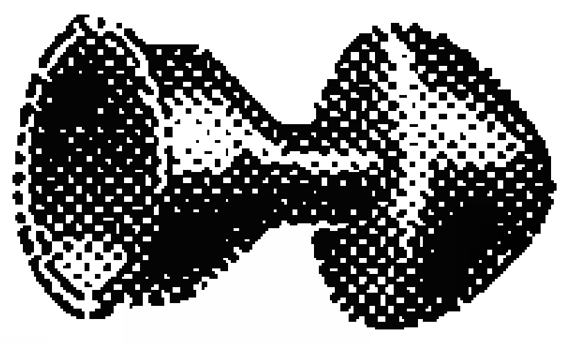

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Fortunes Waiting for Inventions

(Continued from page 129)

jaws that may be so regulated and adjusted that almost any article of reasonable size and shape may be held firmly from all four sides.

This would make heavy pressure quite unnecessary and yet would offer a grip that cannot be had with the present two-jawed vises. I am sure, judging from the very ingenious answers that I have passed upon in connection with other problems, that we have readers who can do the trick.

Specifications: Such a vise can cost two or three times the amount now charged for ordinary tools of this nature for the simple reason that they will be worth it in the material and time saved. Should not have too many parts—not more than twice as many used in 2-jawed vises.

Exploitation: The device should be patented only in the leading industrial countries of the world.

3. Padless Rubber Stamp

The self-inking rubber stamp is still to be invented. Why is it that we cannot combine a pad and a stamp into a single unit? What we need is a stamp that will receive its ink by absorption in some fashion, the ink being held in some sort of a porous reservoir back of the letters.

The stamp should print clearly every time it is pressed against paper and at least five thousand impressions should be made before it is necessary to refill the ink reservoir.

Specifications: Such a rubber stamp could sell easily for double the price of the present stamp. It should not have any intricate mechanism and the idea of using a moving ink ribbon should be abandoned. These ribbons are costly and they require some sort of a mechanism to move them along.

Exploitation: The pad should be patented in all of the leading countries of the world and it should be sold only on a royalty basis due to the millions that are made every year.

4. Non Clogging Plane

How many of us workbench fans have been annoyed at chips of wood becoming clogged between the blade and the bottom of the plane? We stop our work, remove the blade and take the chips out, but how many of us have stopped to think that here is a real problem in invention that would be worth a neat little figure if we could solve it?

Here again simplicity must be called upon to turn the trick. Perhaps a change, a slight change indeed, in the construction of the plane or in the mounting of the blade, will solve the problem. It may be that a differently ground blade will bring the result. At any rate, here is a nice little problem whose solution will yield a young fortune.

Specifications: Should add little or nothing to the cost of a plane and the plane should be unaffected no matter what kind of wood the plane was used to work.

Exploitation: Should be patented in all of the leading countries and should be sold strictly on royalty unless a sufficiently large price could be commanded on an outright sale.

Fortunes Waiting for Inventions

5. *Adjustable Cake-baking Pan*

The modern women are quick to see and use new things, so accustomed have they become to mechanized housework. Only the other day, a lady friend of mine who does a great deal of baking said to me, "Say, why don't you have some of your inventors make a cake tin that can be expanded and contracted. I have about twenty cake pans of different sizes in my pantry and they take up too much room."

It would seem perfectly possible to design a square cake tin that could be made larger or smaller and a round one that would have the same feature. Then if a lady were baking a cake for a small family of two she would not have to bake in a container that was meant for a family of five.

Specifications: These new cake tins should not cost much more than the present kind if they are to sell fast. They should be designed in such a manner that there will be no danger of the batter running out of cracks or sliding seams.

Exploitation: Only American women would be quick to see the advantages of a thing of this kind and therefore it should be sold only and patented only in the United States and Canada.

6. *Meter Reading in Dollars and Cents*

Our present house meters used in connection with utility lighting circuits read in kilowatt hours. These meters are read by men and the figures carried back to the accounting department where they are used in computations of the monthly bills for service.

But why not a meter that will read directly in dollars and cents? It would not only save much work in the computation of the statements, but it would also permit the housewife to determine whether or not her lighting bill was reaching a point beyond her budget.

Specifications: Here is a fine problem with the promise of handsome rewards. What the inventor needs to do is not to change the design of the entire meter but rather to replace the present dials with dial reading in dollars and cents and to have these dials adjustable to compensate for fluctuation in rate.

Exploitation: Should be patented only in the United States.

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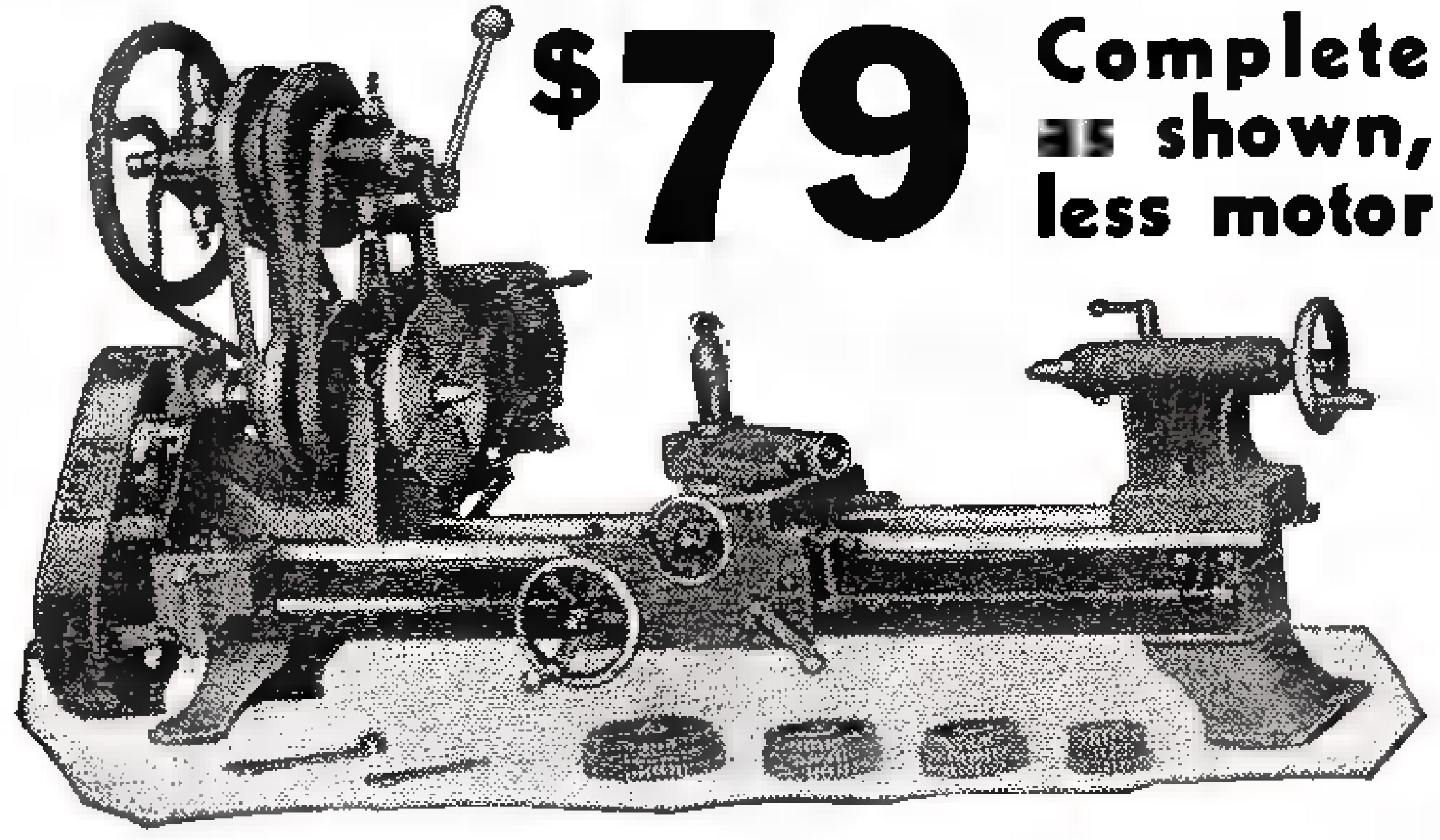

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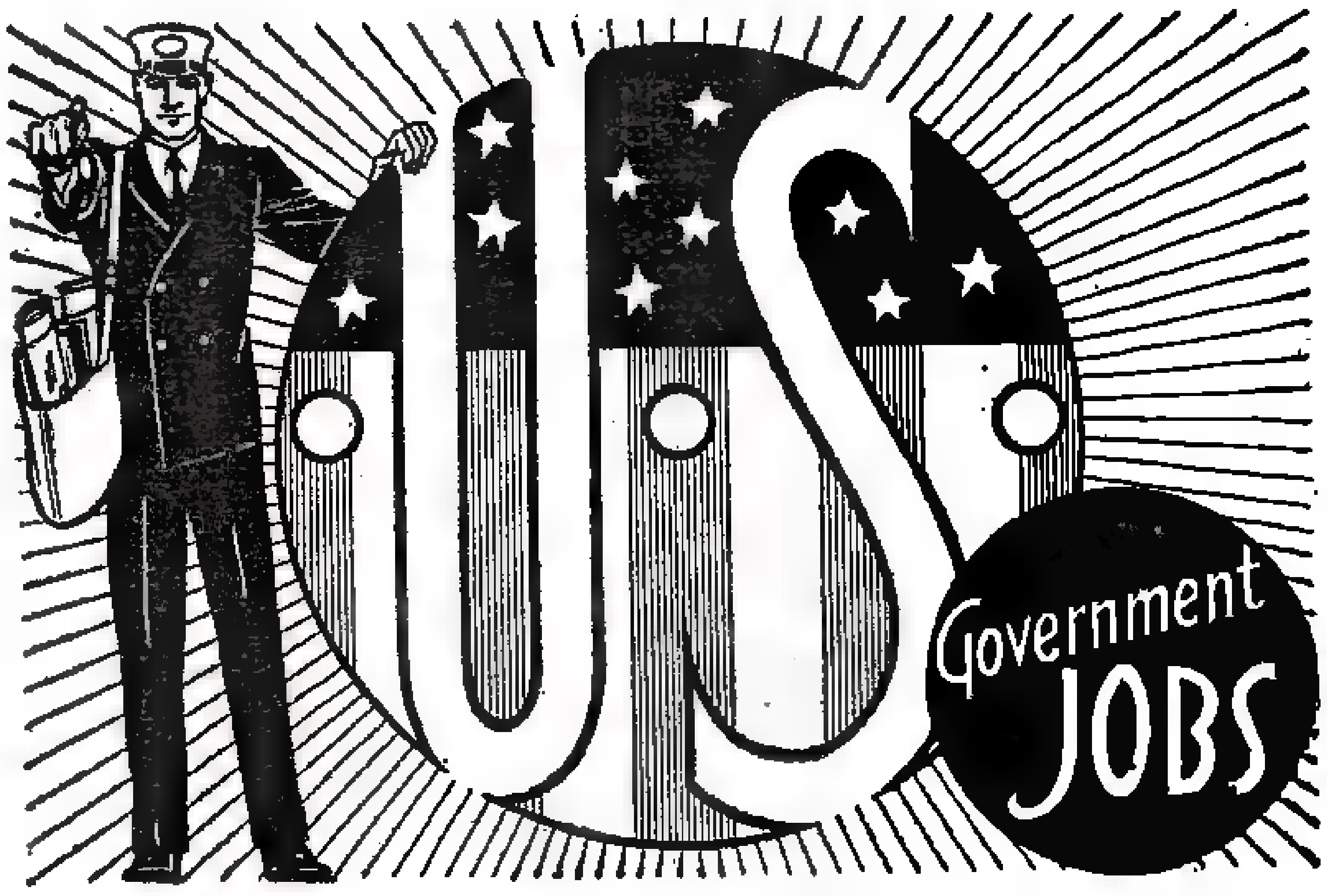

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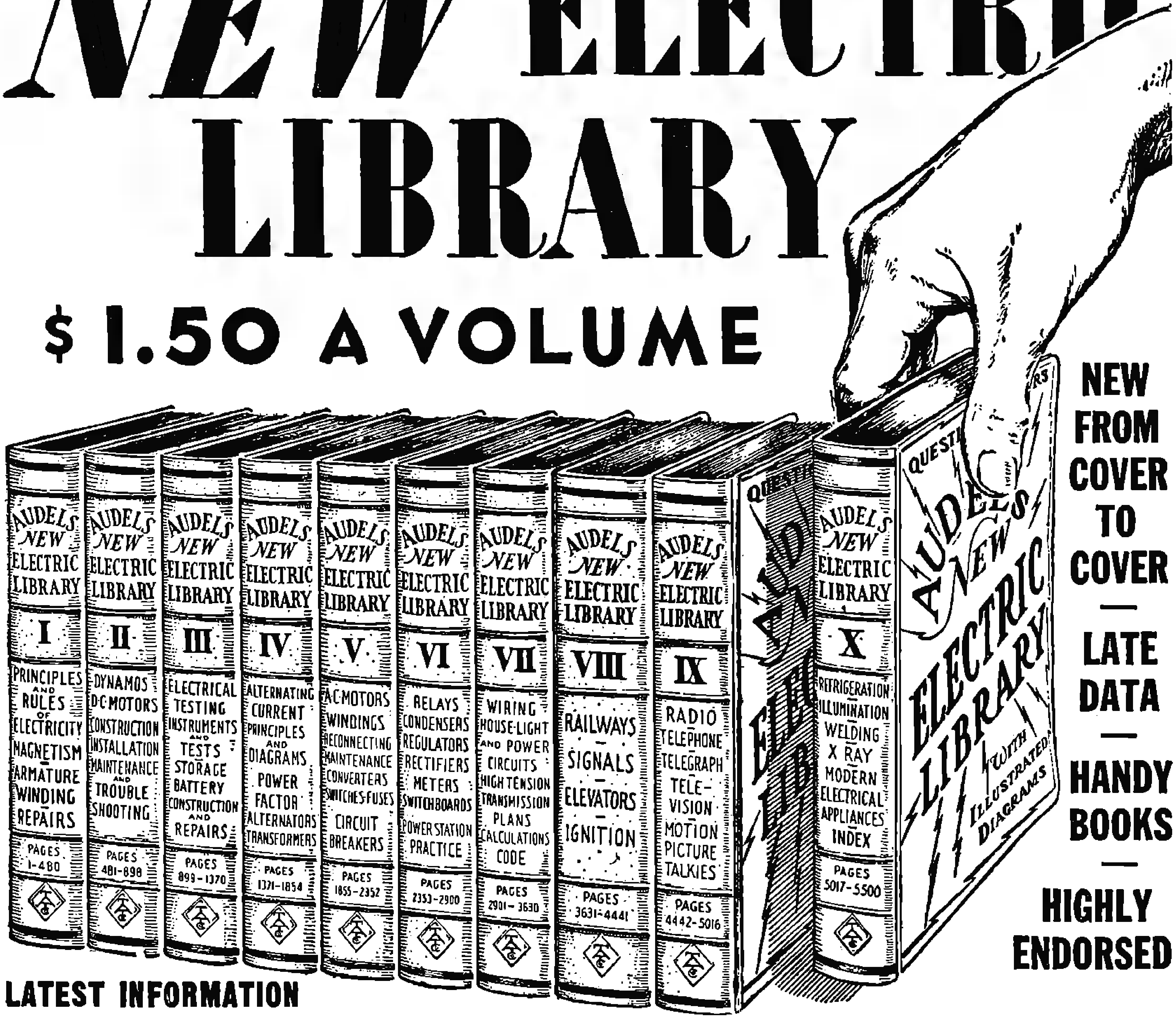

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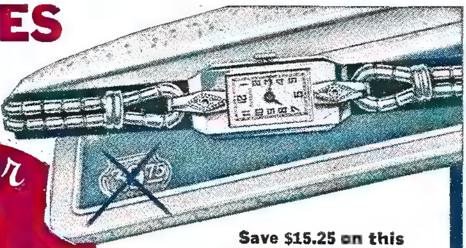

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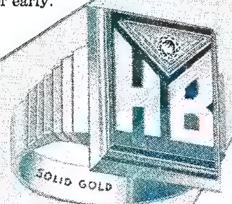

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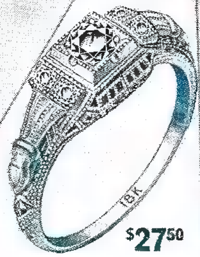

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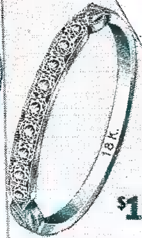

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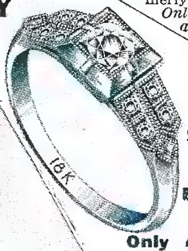

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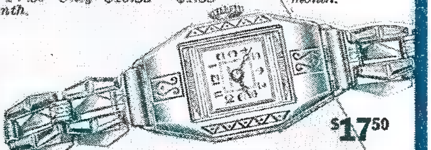

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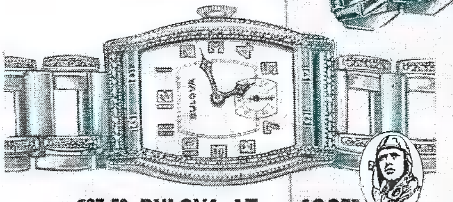

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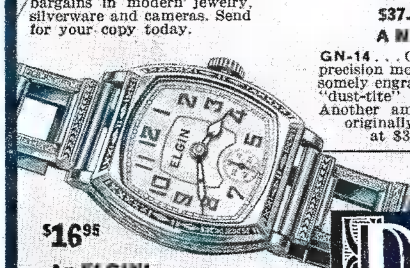

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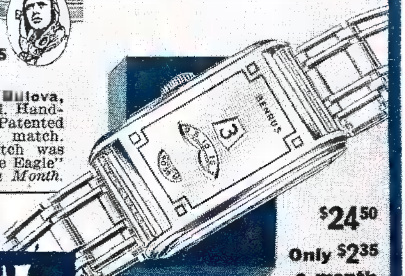

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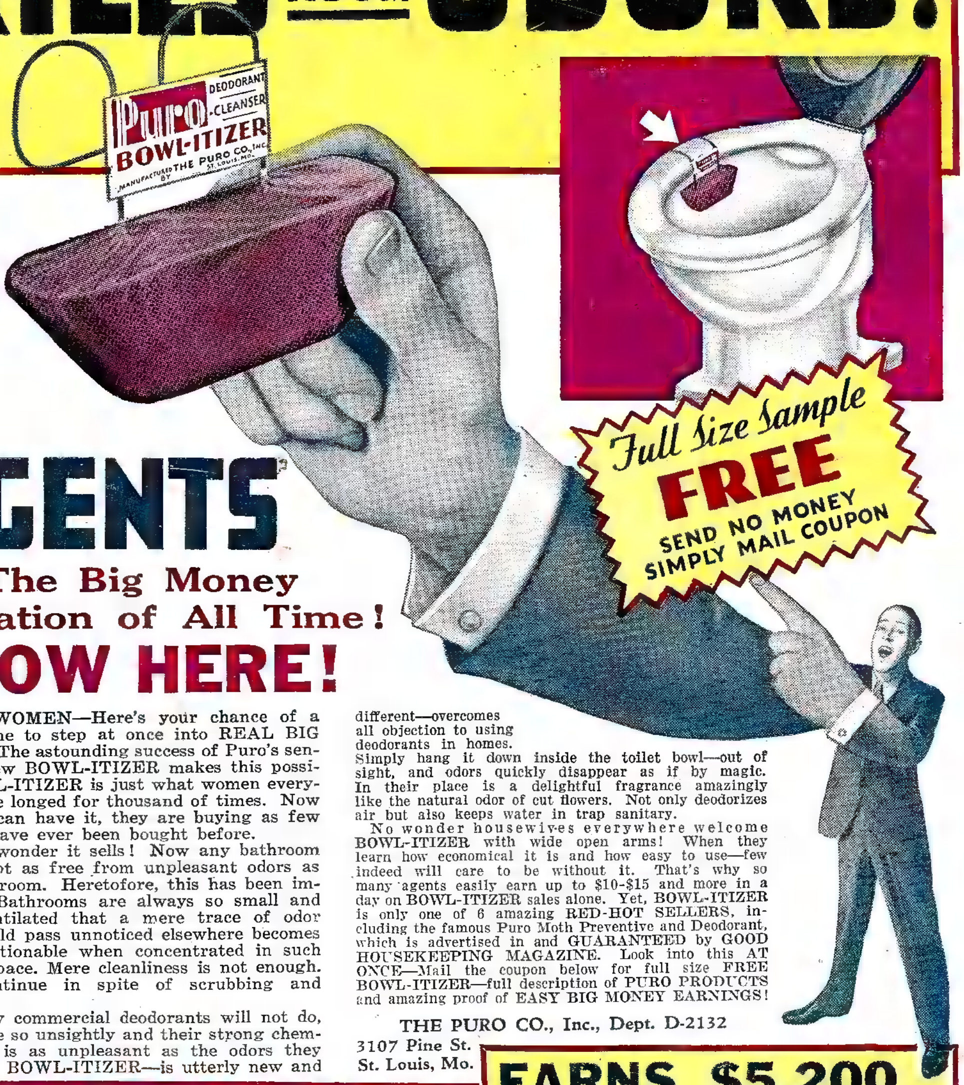

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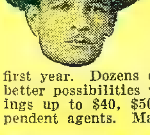

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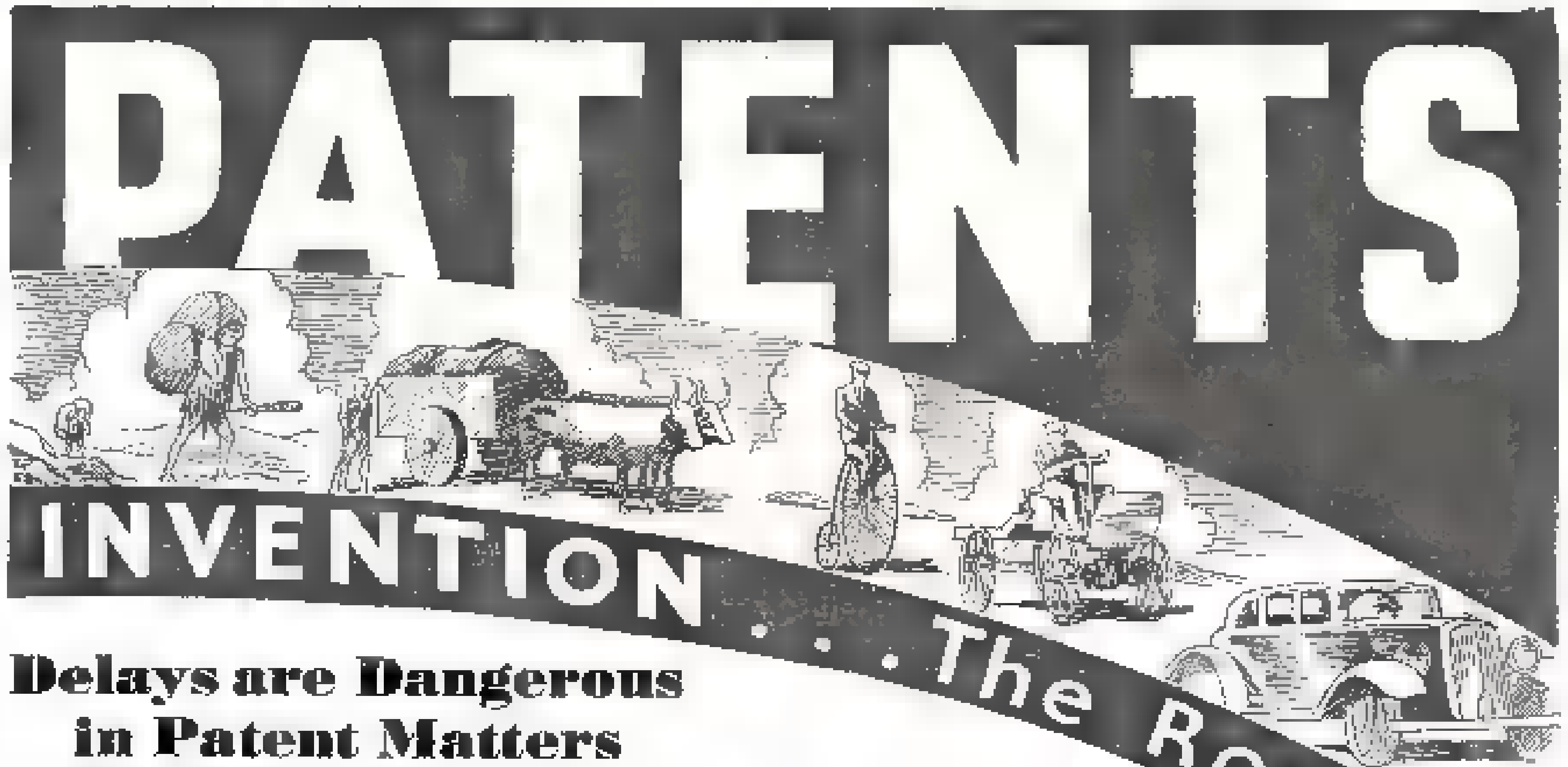

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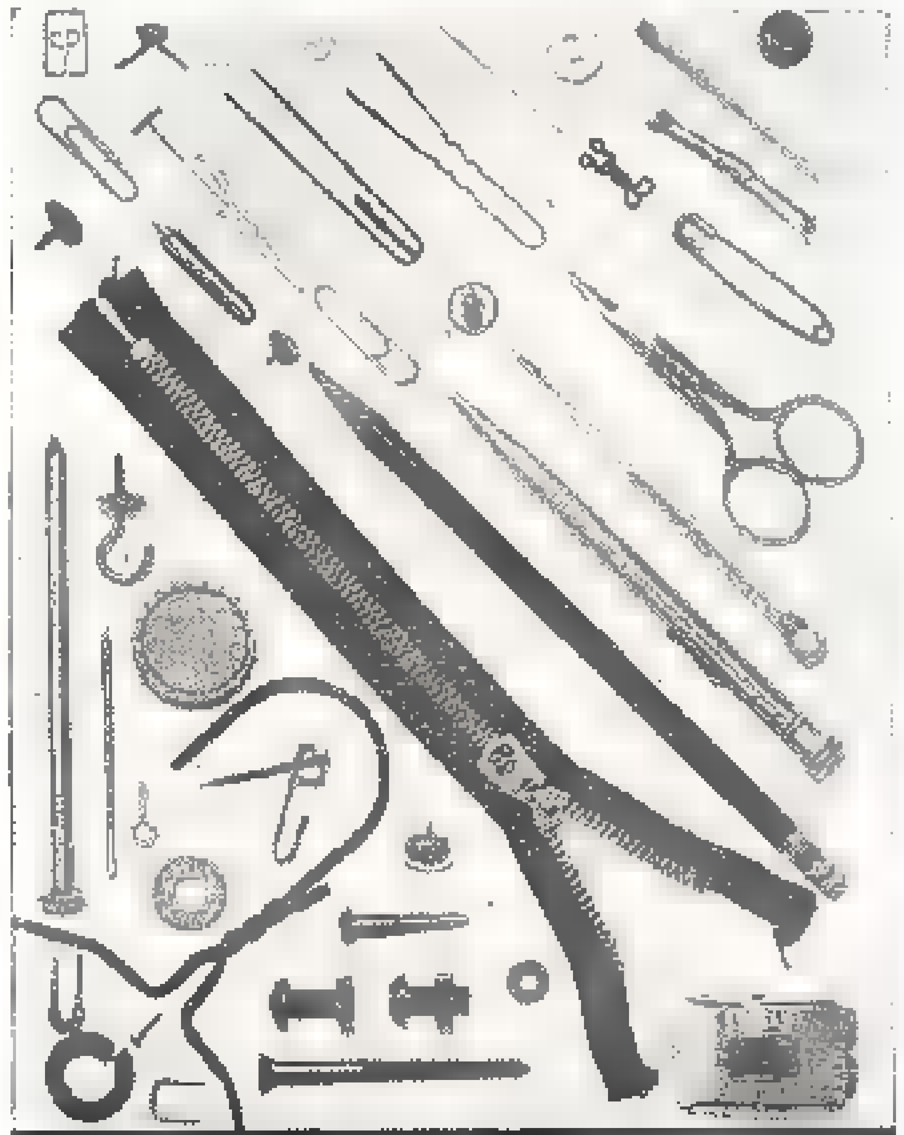

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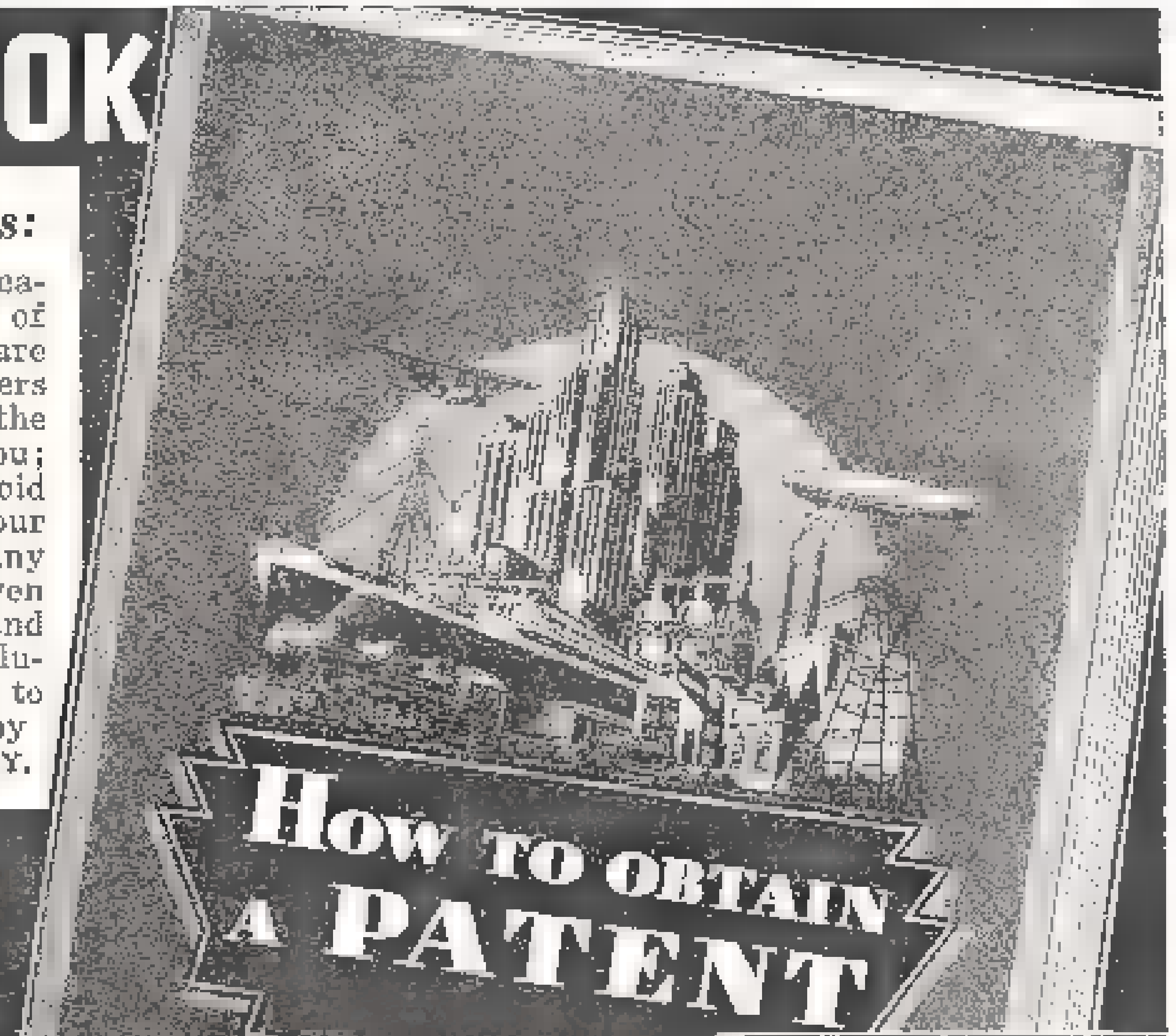
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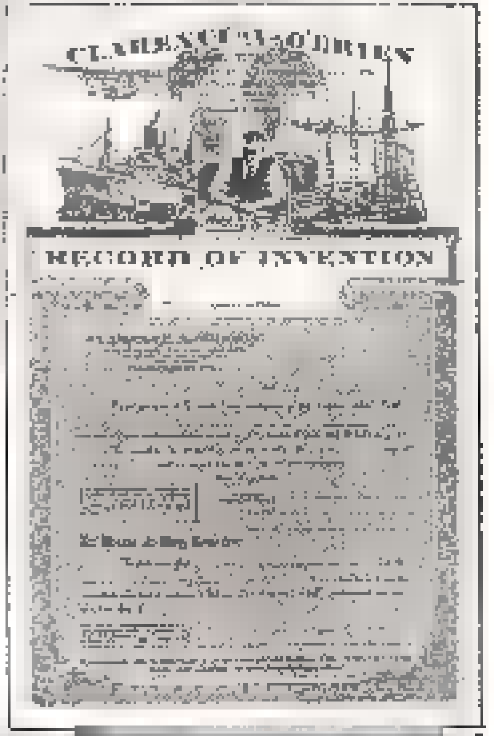

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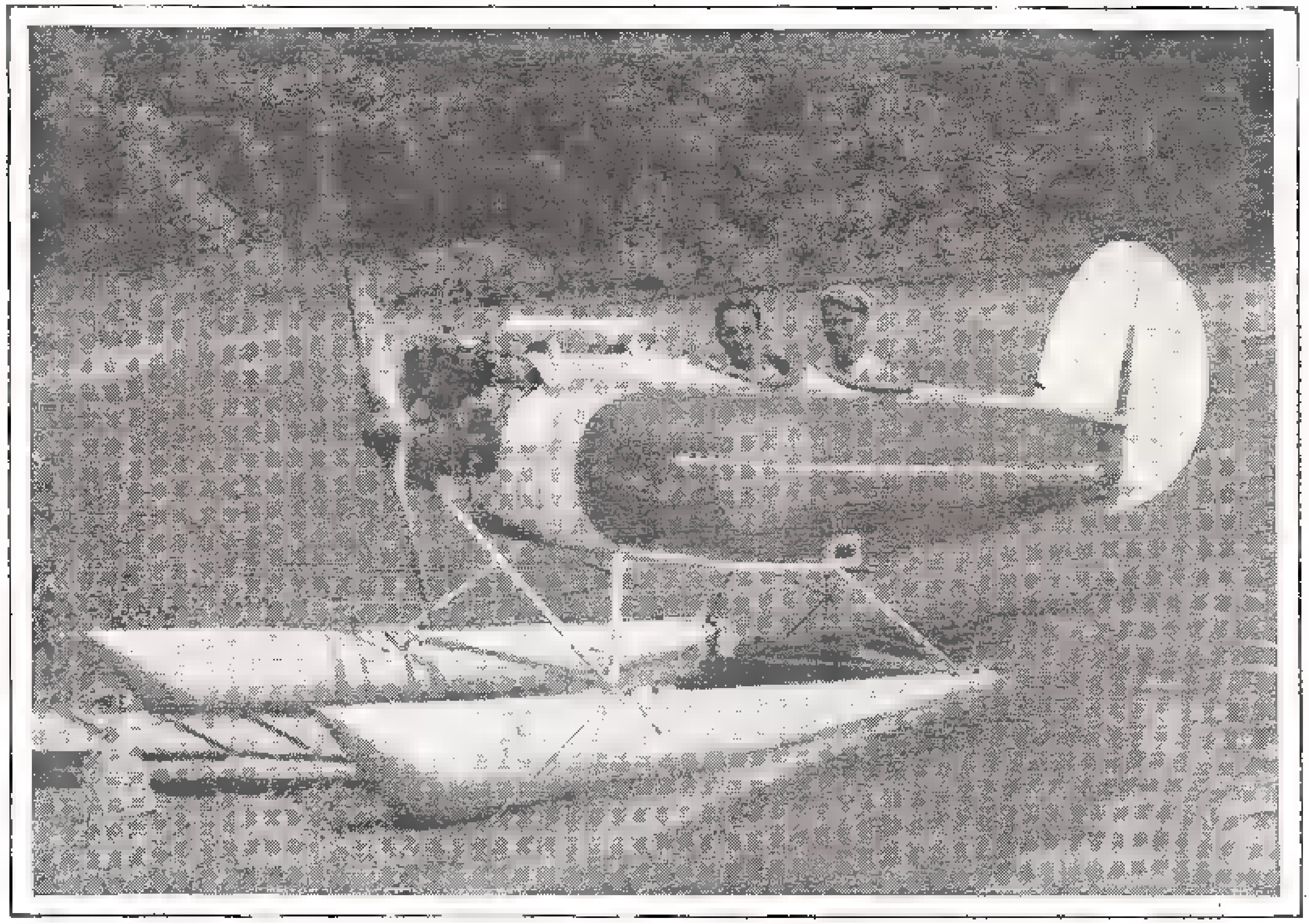


J. Alex Steel, of Tyrone, Penna., built this water wagon or straddle bug with the aid of help from a good friend. They have had a lot of fun, if not much speed, from the rig and are here shown in a typical pose for navigators of water straddlers—and a neat job the ship is. New pontoons will soon be added. Round ones throw too much water.

Andy's Shop Mail Box

The popularity of the Greasemonk's line of guff has insistently made itself felt in our editorial offices to the point where it is necessary to accord Andy a two-page opener for his singular monthly expression.

I BET a guy last night five bucks that a duck has got a gizzard. He swore up and down that a duck has a stomach, like a mammal.

The bet is on. I says put up or shut up, so we buy a duck. I hated to murder the pretty thing, but gizzards are gizzards and so we rigged up a high tension electric chair for the duck over at Sam Wing's experiment shack and it was all over with one quack.

The duck has a gizzard.

I have five bucks and a three dollar duck, so I'm that much richer today.

Only woodpeckers have stomachs.

* * *

Even a downtrodden greasemonk can be right once in a while. And I usually am.

* * *

Say, boys, (forgivin' the above pat, please) how do you like it that I'm getting a double page spread to this bucket of tripe?

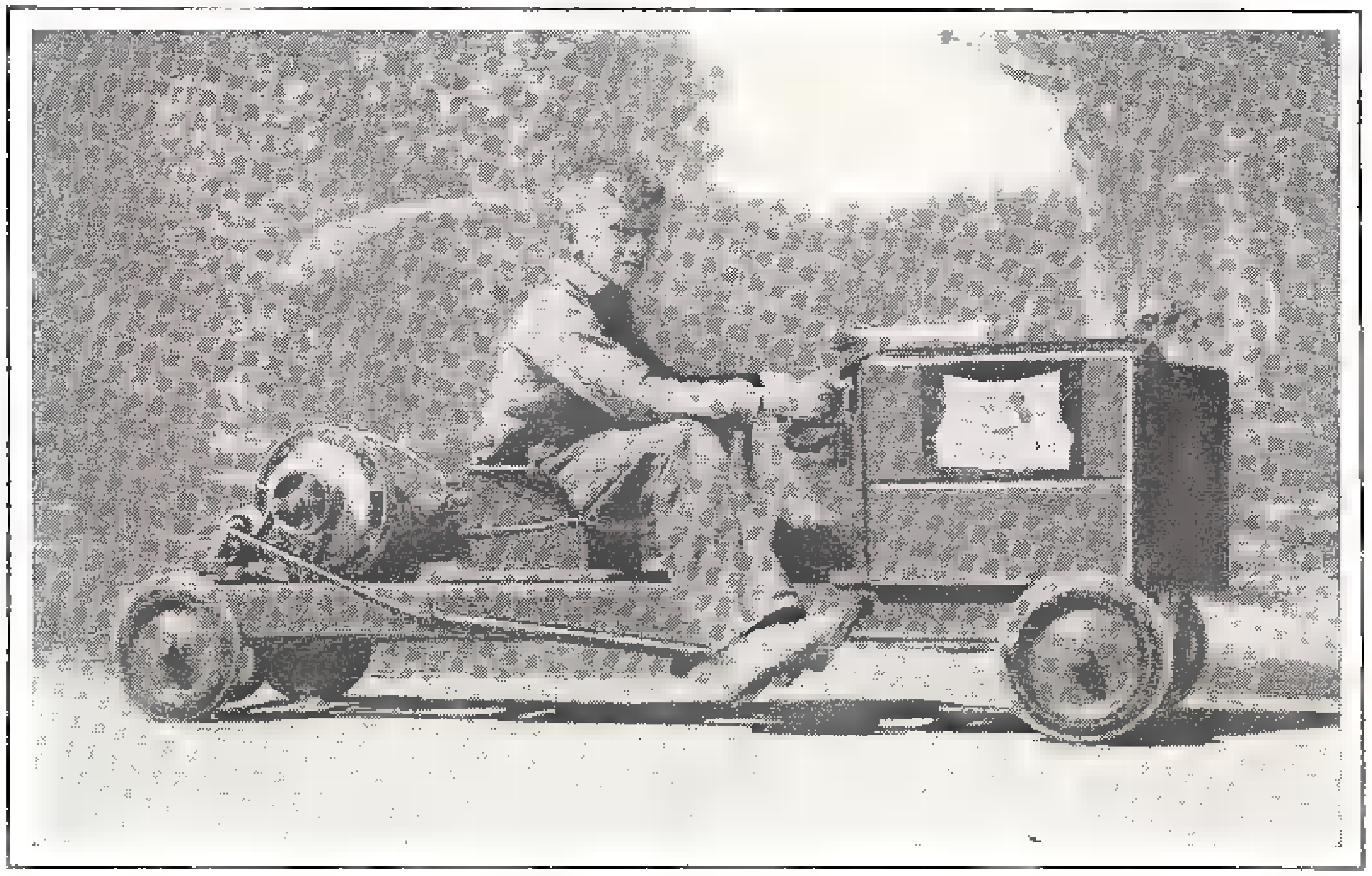
Every month since the old book first went to press I've been peckin' and punchin' out rambling thoughts as the months wear on, and after a while each month what has been written is collected and slammed into the sheet like so much lead pipe.

There was a recent editorial overhaul when the book went to fifteen bat boots per copy, and the powers that be said in effect to cut out the big how-to-builds (too much of them) and to run smaller stuff to appeal to everybody. And to let that guy Andy have more rope, say give him a double opener. Geez, he can write.

* * *

That is all the self uplift I'm allowing myself this issue. But now we have more room, and have become a feature instead of an interesting personal guff-line used to hang reader reactions on.

But with success, do I change? Not me, bro. I'll still sleep in my cot alongside the draughty hangar wall at Robbinsdale, where we have bigger and better crickets, and I'll still wash my one and only flannel shirt in water I haul myself from the old strongarm pump, on account of with all this success I might get a pay cut. Democratic, I am.



Seph Holmes, Phoenix, Ariz. lad shown with his scrubbin' machine automobile, which can do 25 miles an hour with the wind conditions just right. Its cost was only $12.00 complete. Wheels and tires are of the coaster wagon variety.

Really I can't afford to change. I'm taking up drawing—(drawing paychecks in advance). But we're happy, things is somewhat secure, and with spring comin' up over the south forty there ain't much to squawk about.

Here is a letter from Elmwood Park, Illinois. where many are called but few get up.

Att. Herr Andy von Grease Monk.
Gentlemen.

Read every copy of M-M since it was born and would like to build a plane, but you know the /?:"—() !!!!! inspectors.

Why don't you run a "HOW TO BUILD" a Crawford Power glider, you know this is an A.T.C.

A reply to this will be appreciated as to whether or not there is a possibility of ever publishing plans for the above, or if there is a reason for not doing so.

Yours truly,
A. G. Brandeau,
7935 Cressett Drive,
Elmwood Park, Ill.

P. S. Stamped addressed envelope for Aerio Postale enclosed.

* * *

By the way, boys, Sam Wing asks me to tell you that his pet, the Packmag, will not be put out until later in the year. As magazines we all live under one roof at this publishing house, and the powers that be, well satisfied from their profit-point-of-view that the Packmag is sure-fire, are holding off until later, feeling that the stands are over-magazined for the summer.

* * *

That gives me a chance to get in some good licks while Sam is doin' some of his beloved re-searchin'.

Incidentally he turns over to me a letter from a gent in Dallas:

Dallas, Texas.

Mr. Wing, Dear Sir:

Have just been reading issue No. 4 of the "Packmag."

Being like thousands of other readers, I could hardly wait to get it.

My opinion of your magazine is, to leave it like the 4th issue, as it is as near perfect as any reader could ask for.

I had been working on my midget racer, the "Flying Mare" before I bought your issue No. 1.

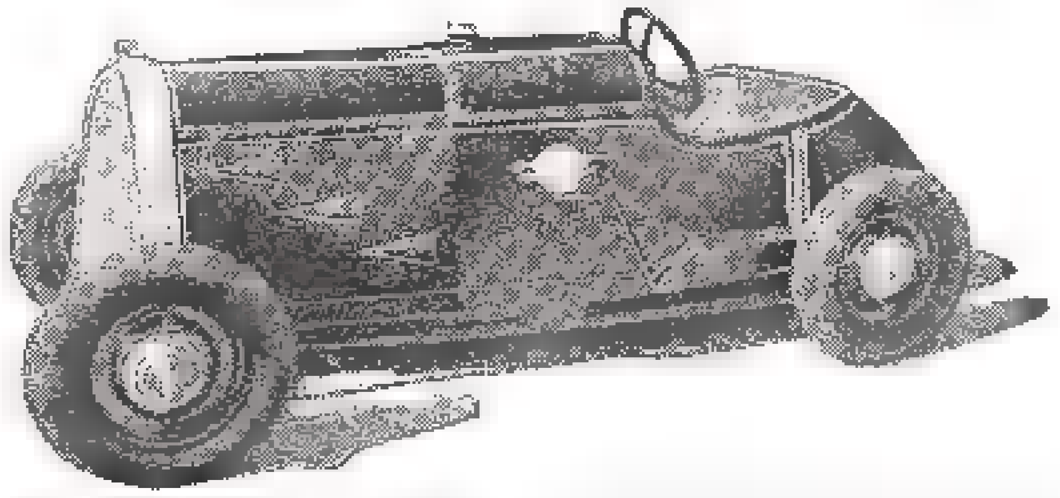
But, I hadn't finished it so, after all, it gave me some great ideas. Thanks to you all.

The results of months of labor were very good. It takes lots of spare time, but when you've finished, it's well worth it.

You fellows are to be congratulated, for your "Experiment Station" turns out some wonderful work. Such models and plans that give joy and pleasure to thousands of boys all over the country.

I firmly believe that the "midget car" in this issue is the cheapest that ever could be built,

(Continued on page 12)



Roy Hunnicutt, of Dallas, Texas, built this sweet little doodle bug from adaptations. Her name is "Flying Mare."

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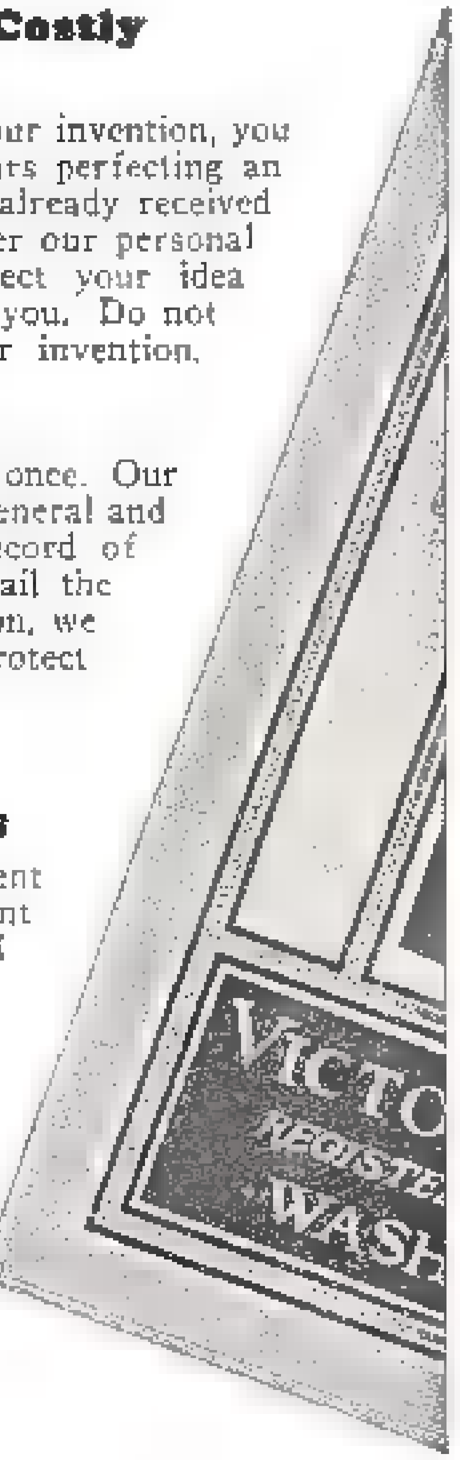

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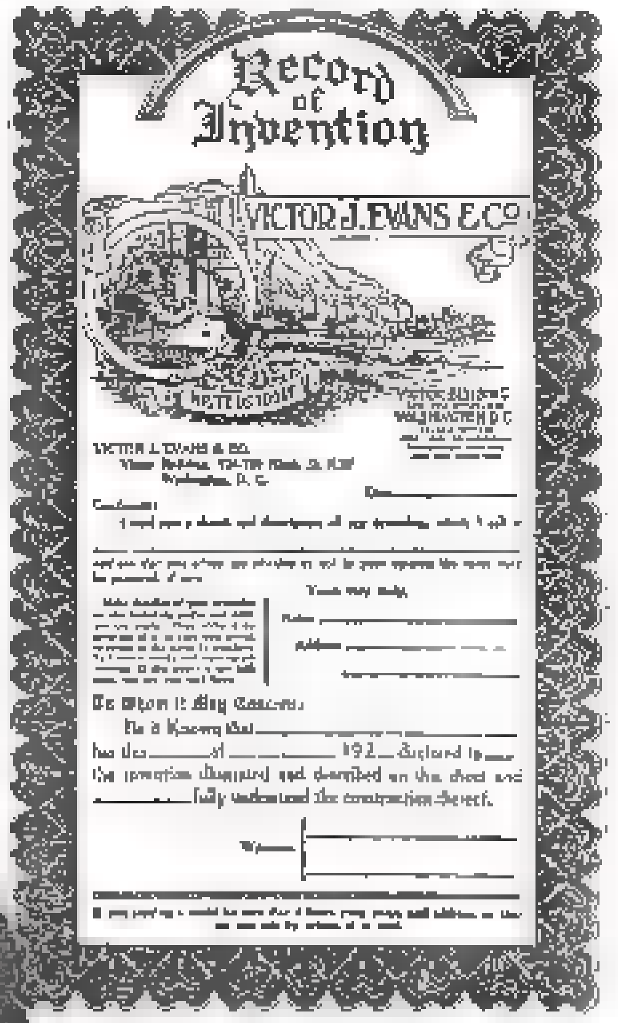

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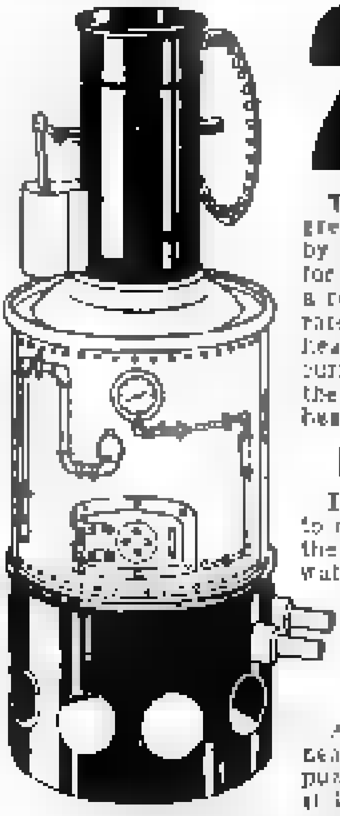

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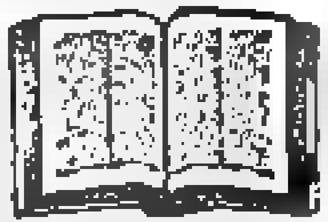

GREAT CURIOSITY Smallest Bible in the World. Size of a postage stamp, **200 Pages.** Said to bring good luck to the owner. A genuine work of art. Must be seen to be appreciated. Make big money selling them to friends, church, bazaars, etc. **PRICE 15c** each, 3 for 40c, 12 for $1.35, 100 for $7.50. Also obtainable in Leather Binding, with gold edges. Price 50c each, 3 for $1.25, $4.50 per doz. Magnifying Glass for use with Midget Bible 15c.

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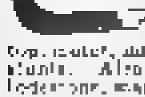

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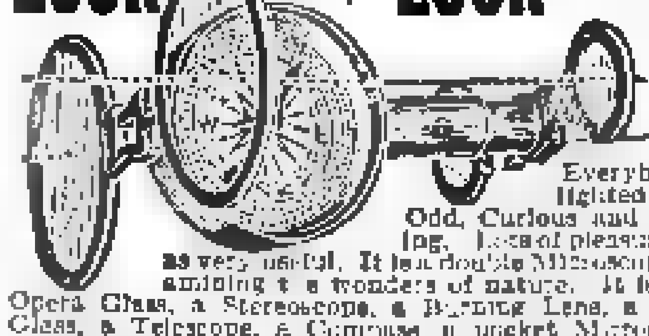

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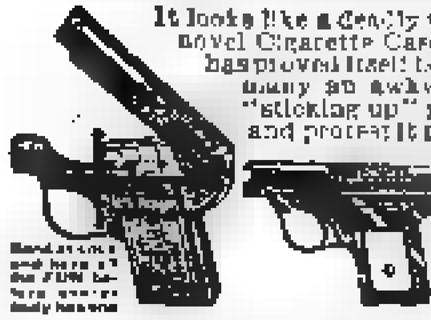

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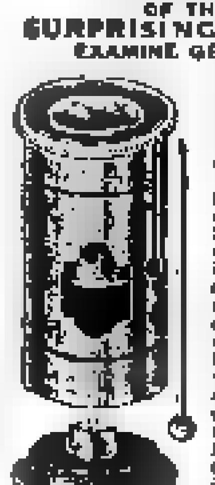

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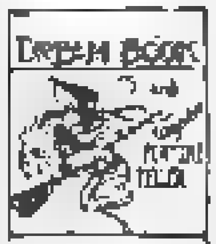

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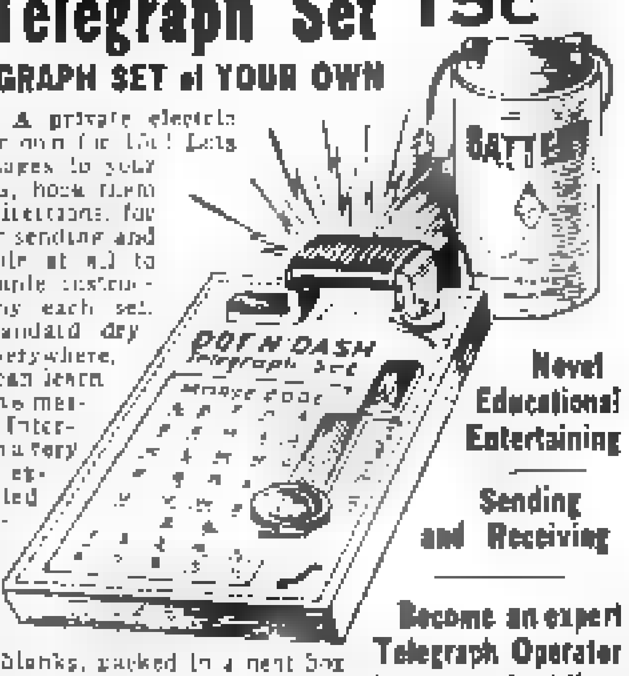

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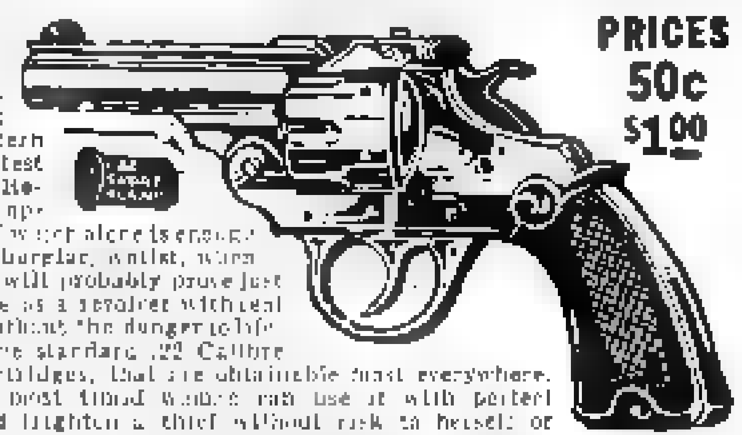

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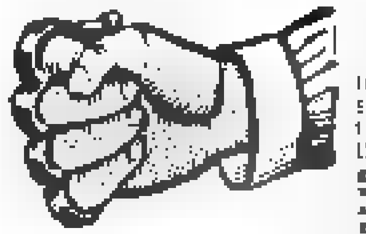

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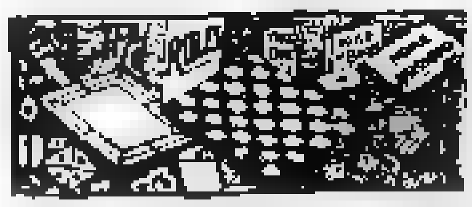

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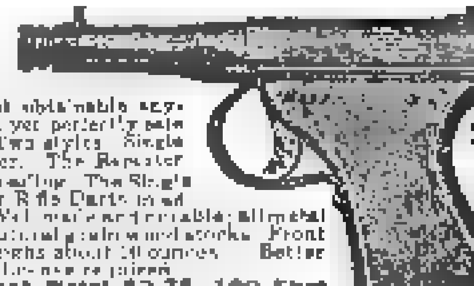

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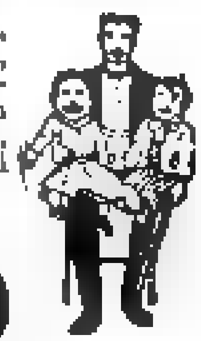

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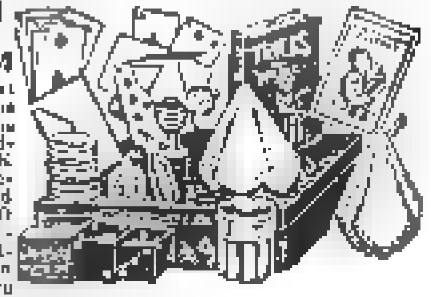
Apparatus and Directions for a Number of Mysterious Tricks. Enough for an Entire Evening's Entertainment............ $1.00

ANYONE CAN DO THEM



It is great fun mystifying your friends. Get this Conjurer's Cabinet, and you will be the cleverest fellow in your district. It contains the apparatus for ten first-class tricks, including The MAGIC BALL AND VASE TRICK (a wooden ball is placed inside, and upon replacing the lid has disappeared and is found in someone else's pocket); the HINDOO TRICK CARDS (can be made to change completely no less than five times); DISAPPEARING COIN BOX (a coin, placed in the wooden box, vanishes entirely or changes into a coin of another denomination); The GLASS GOBLET TRICK (a coin is dropped into a glass of water and when the water is poured out the coin has vanished and is found somewhere else); the RIBBON FACTORY FROM THE MOUTH TRICK (a seemingly endless supply of colored paper ribbons comes out of your mouth); the DISAPPEARING HANDKERCHIEF (a handkerchief held in the hand mysteriously vanishes); the WIZARD'S RING CHAIN TRICK, the ENCHANTED BOTTLE (no one but yourself is able to make it lay down); the GREAT HAT AND DICE TRICK (a large die is placed on top of a hat, disappears and is found underneath, yet no one has touched the hat), and last but not least, the GREAT PHANTOM CARD TRICK, or two from five leaves nothing. Full instructions are sent for performing each trick. In addition to the above, a number of other feats and illusions are fully explained for which you can easily make or procure the necessary apparatus. **Price complete $1.00 postpaid. JOHNSON SMITH & CO.**

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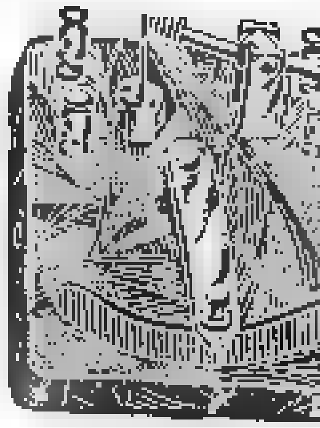

Say what you will about Electrical and Battery Sets, a CRYSTAL set has them all beat for simplicity and clearness of tone. There is absolutely no noise and no distortion—no batteries to buy—no tubes to wear out—no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Reception is loud and clear. This Receiver is guaranteed to work equal to the most expensive Crystal Set you can buy. Has a receiving radius of over 25 miles or under favorable conditions up to 100 miles. Constructed of the finest materials throughout, including supersensitive crystal, assuring quick results. PRICE of Receiver only $1.00 postpaid. Or complete with Ear Phone and Aerial Kit—everything all complete—nothing more to buy, **$2.95 postpaid**

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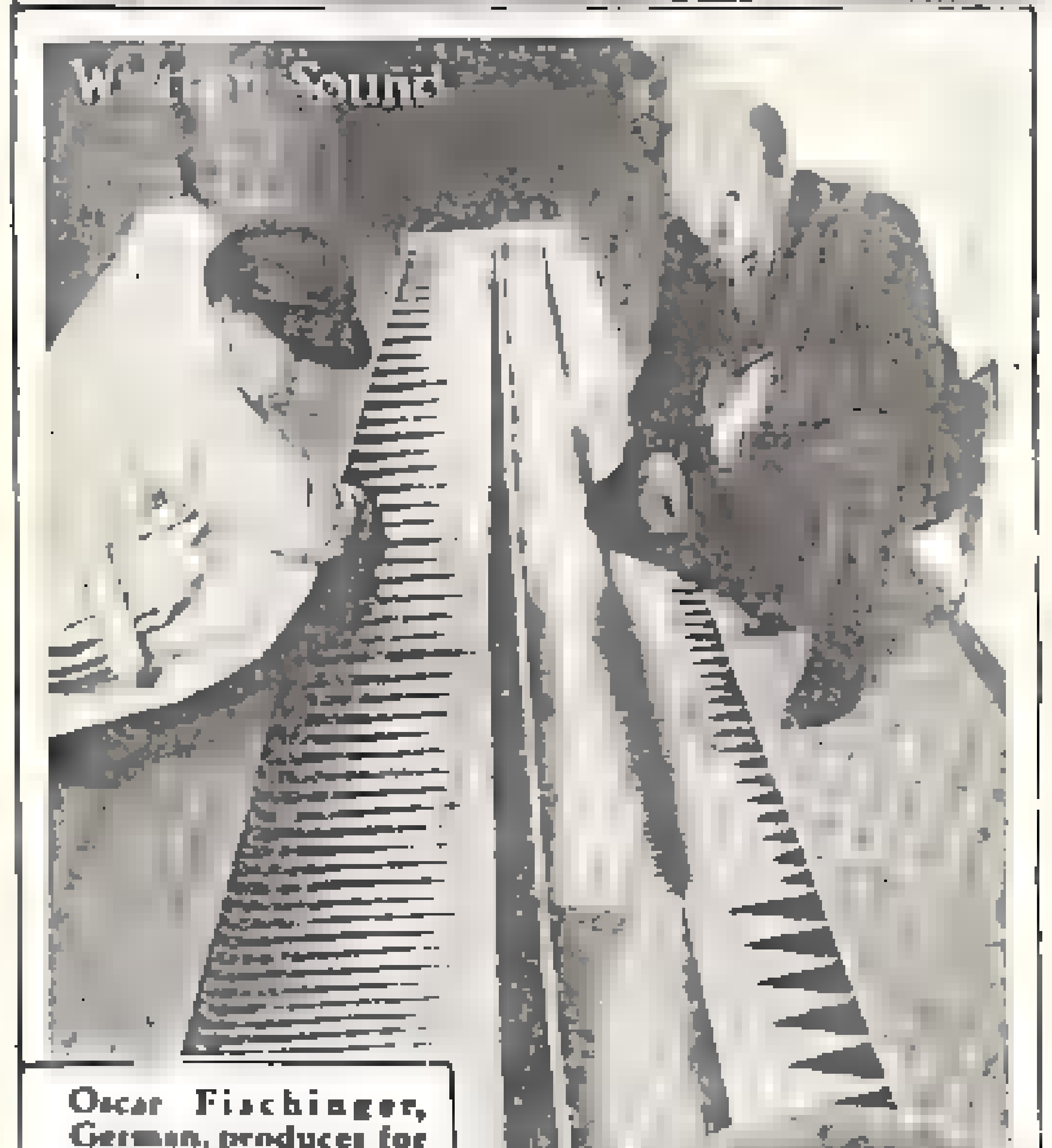
MODERN MECHANIX AND INVENTIONS
EDITORIAL OFFICES, 529 SOUTH SEVENTH STREET MINNEAPOLIS, MINNESOTA — APRIL 1933

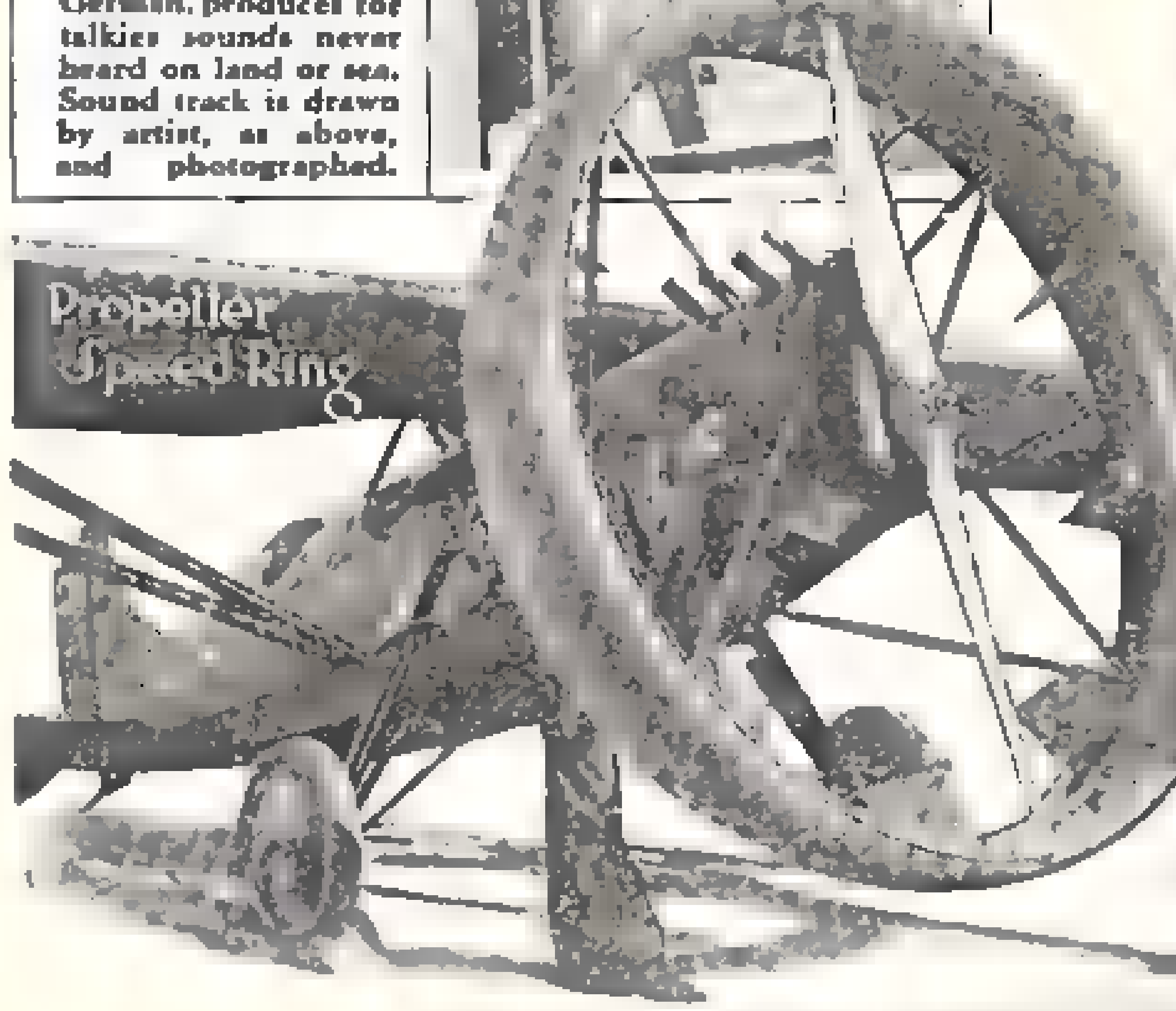
NEW IDEAS of THE MONTH

In the World of Science and Invention

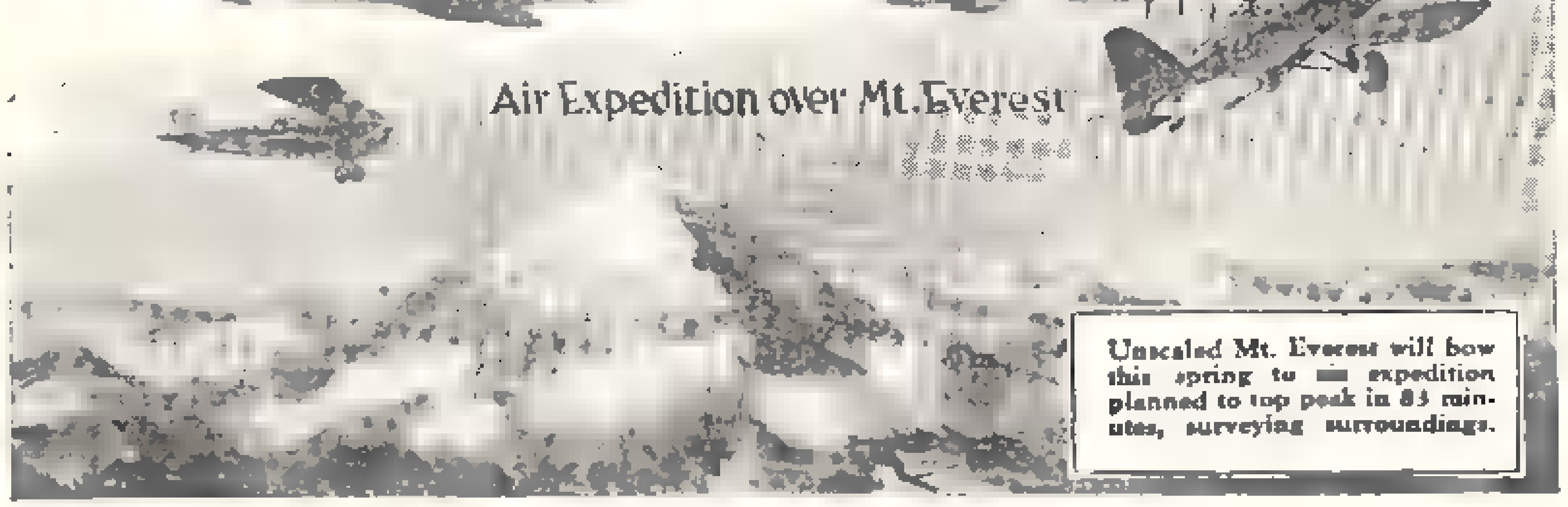


Oscar Fischinger, German, produces for talkies sounds never heard on land or sea. Sound track is drawn by artist, as above, and photographed.

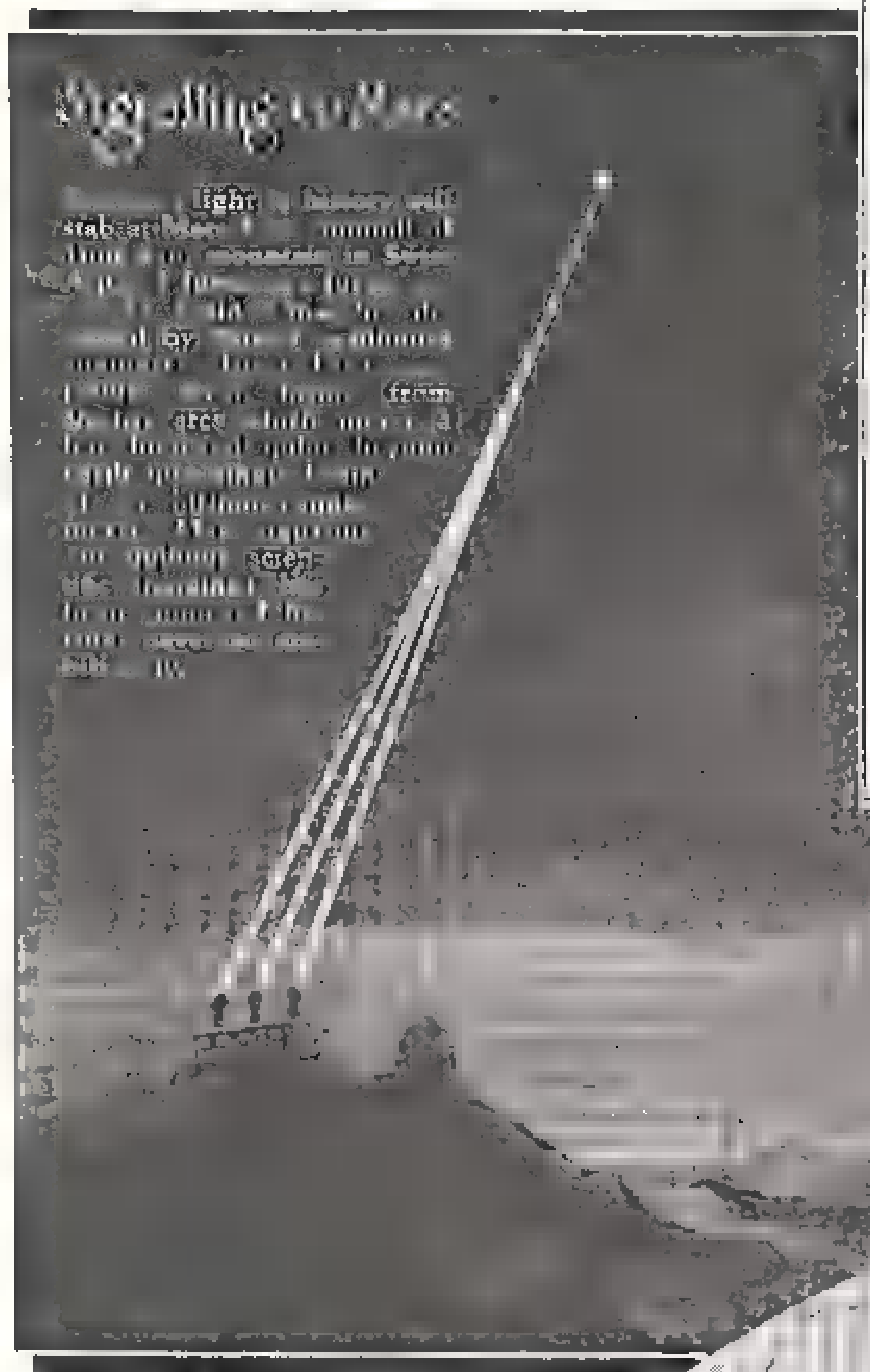
Portable Gun Shield



Miscreants are expected to flee in terror when police approach with portable shield, above. Left, ring around propeller increases controllability and speed of planes.

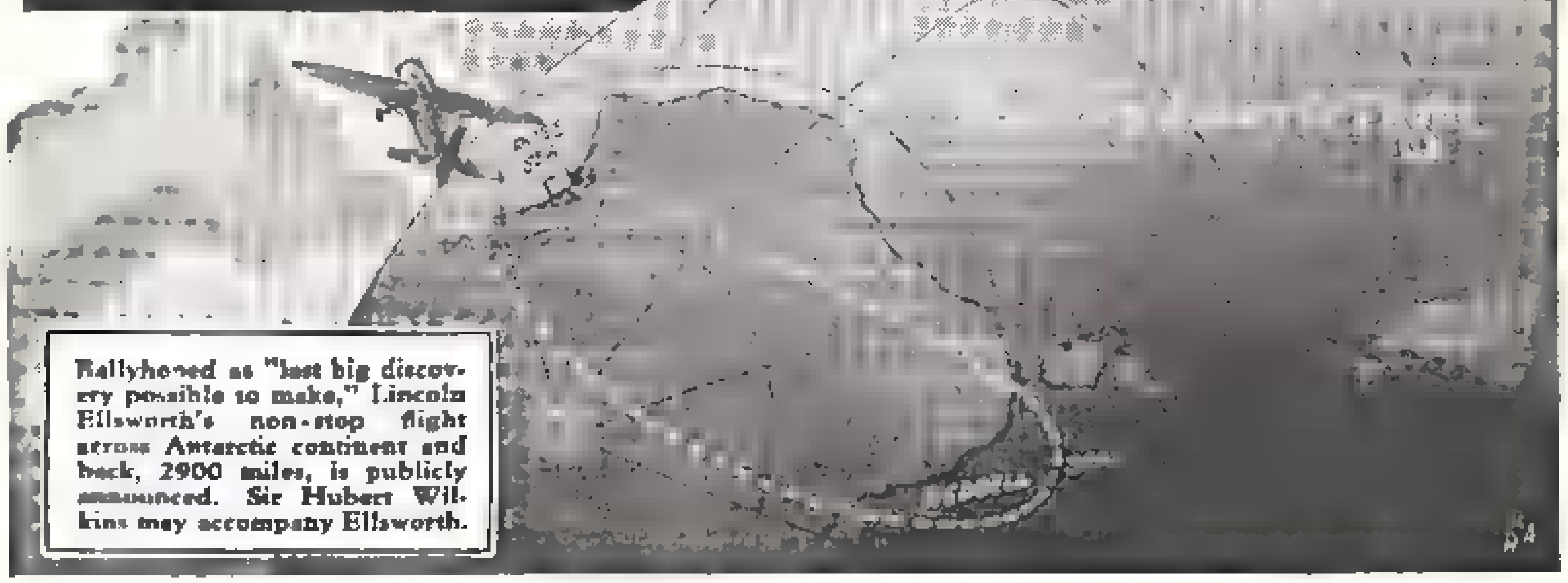

Air Expedition over Mt. Everest

Unscaled Mt. Everest will bow this spring to an expedition planned to top peak in 83 minutes, surveying surroundings.



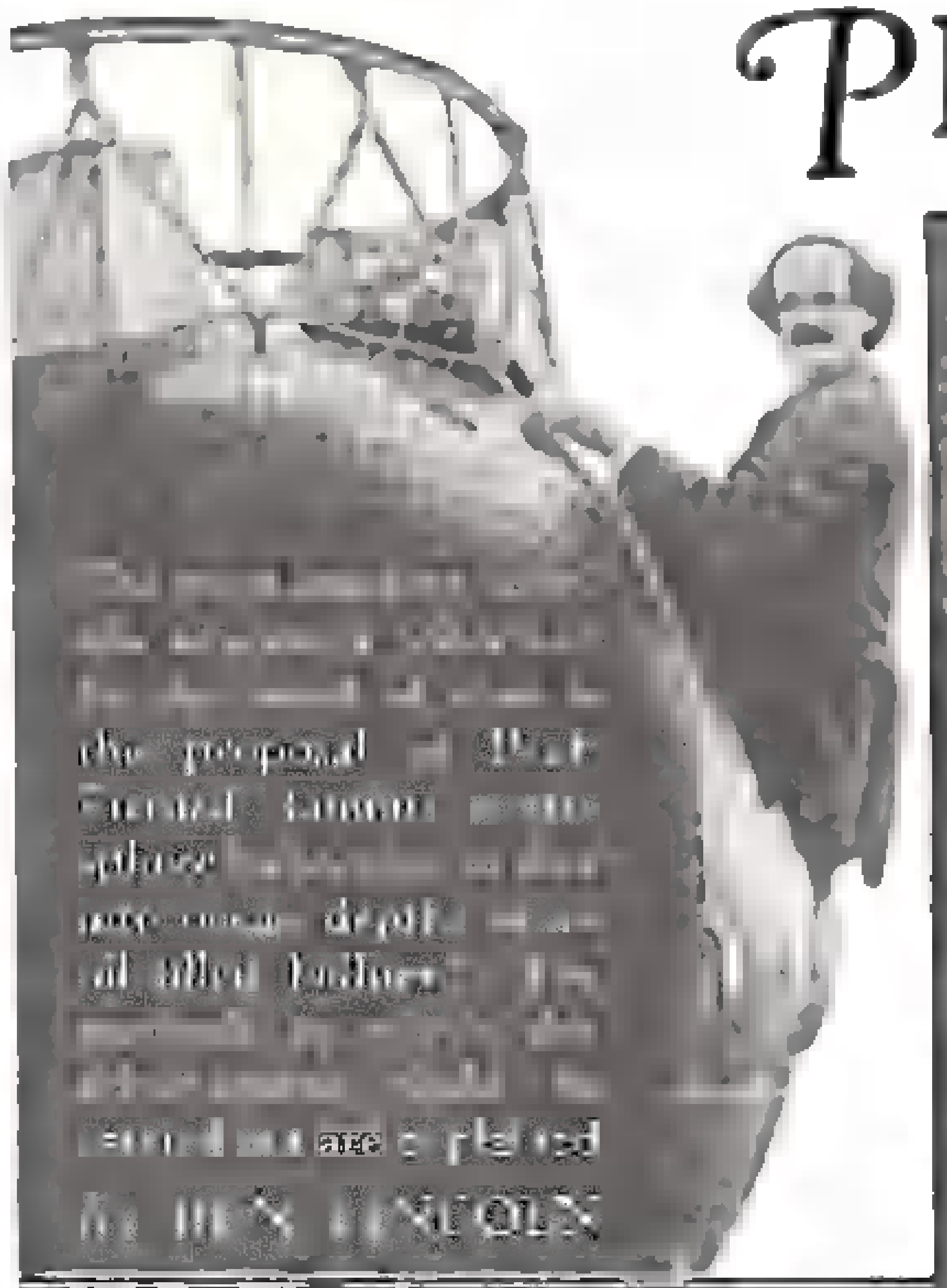
Giggle Gauge

Risibilities of Miss Helen Foder are registered in peaks and valleys graphed by giggle gauge, more formally described by Dr. S. I. Crawley, Cleveland psychology professor, as an instrument for testing hilarity capacity. Device records fluctuations of pulse and heart beat accompanying changes in emotions. Comedy-proof subjects produce a graph of rolls and curves; graphs of less sober-minded resemble cross section of Alps.



Ballyhooed as "last big discovery possible to make," Lincoln Ellsworth's non-stop flight across Antarctic continent and back, 2900 miles, is publicly announced. Sir Hubert Wilkins may accompany Ellsworth.

PICCARD'S Ocean-Diving BALLOON



[illegible] the proposal of Prof. Piccard, famous strato-sphere [illegible] into ocean depths [illegible] balloon [illegible] are completed

By BEN LINCOLN

Prof. Piccard entering gondola on stratosphere flight.

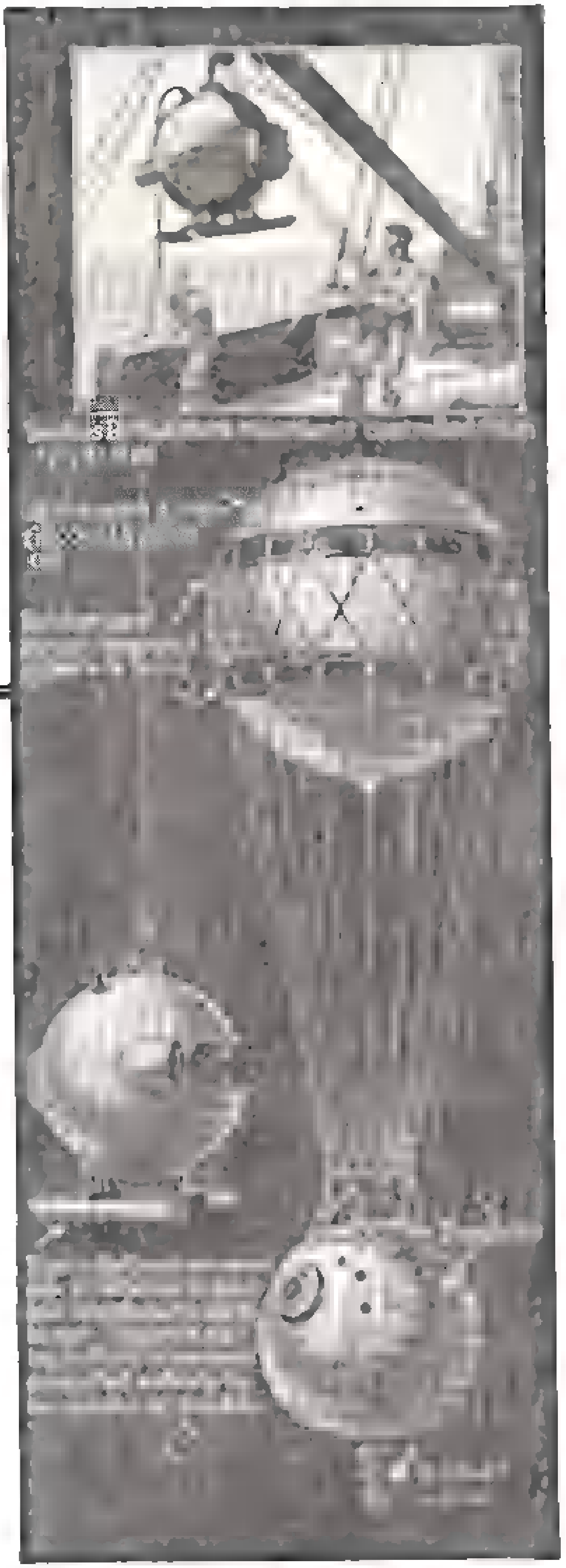
SURPASSING the most fantastic undertaking ever projected in the name of science, and rivaling the fictional exploits of Jules Verne heroes, is the secret project planned by Prof. Auguste Piccard, details of which are revealed here for the first time exclusively for readers of MODERN MECHANIX AND INVENTIONS.

Already a world-wide hero in his own right for his explorations of the stratosphere in a balloon, the proposal of Prof. Piccard must be accorded the sober consideration to which his astounding achievements in the world of science already entitle him.

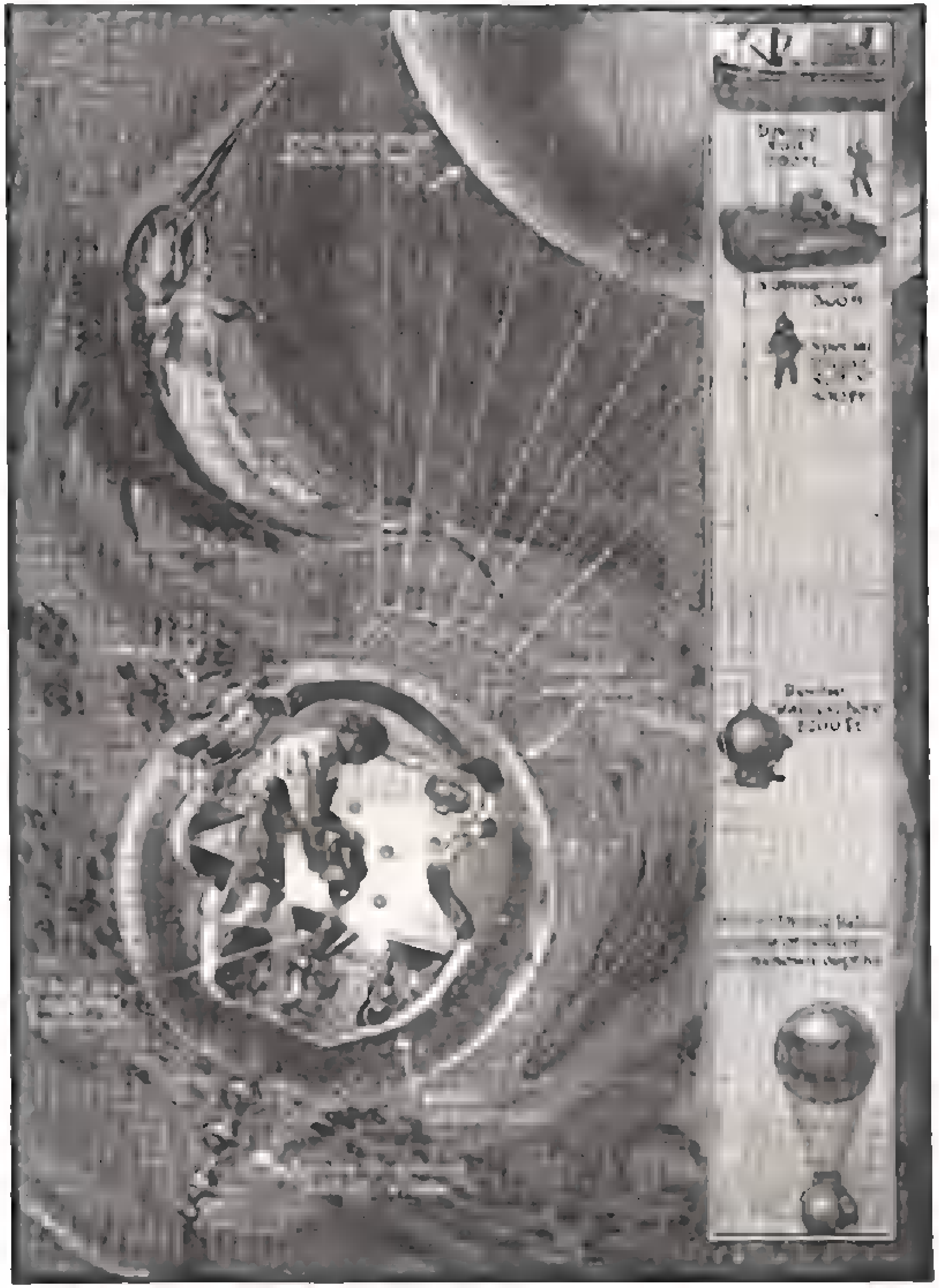
In short, Prof. Piccard's plan, truly the most astonishing idea brought forth in years, is to descend into unplumbed depths of the ocean in a balloon but little different from the one which carried him eleven miles into the air last summer!

Impossible? Apparently—until you realize how thoroughly Prof. Piccard has gone into the matter, and how completely he has overcome obstacles. It is Prof. Piccard's most cherished ambition to explore the ocean floor in his diving balloon, below the 2000 to 3000 foot depths to which William Beebe has penetrated in his Bathysphere.

The idea is far from a new one to Prof. Piccard. Twenty years ago, while at the University of Zurich, he first planned an ocean-bottom exploration, but the war prevented. But the undersea balloon voyage was never abandoned. His decision to make a stratosphere flight rather than a



Comparative performance of Beebe Bathysphere, Piccard sea balloon. Advantage of latter is control from within.

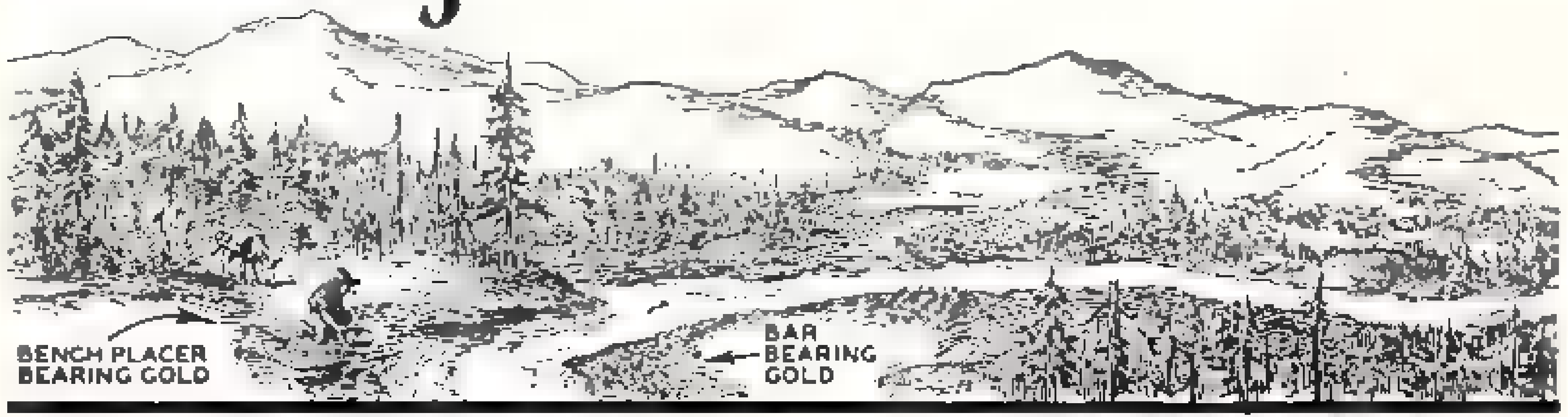


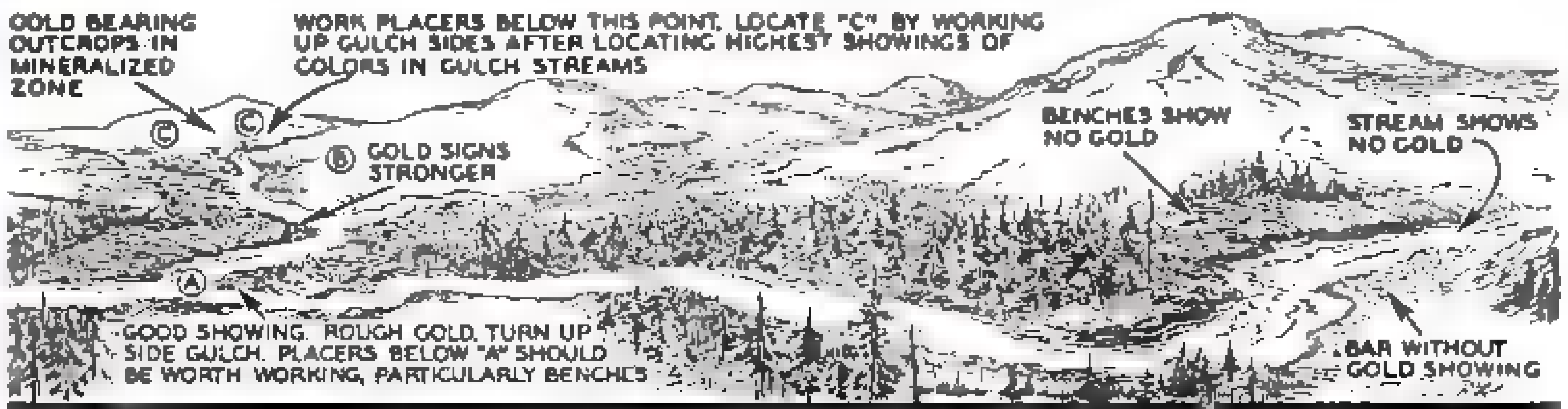
Interior arrangements of the diving balloon are strikingly shown in this drawing. Comparative depths to which different types of submarine machines can descend are given in the panel at the right. Note the mechanism for releasing ballast.

Easy Lessons for the Gold Hunter

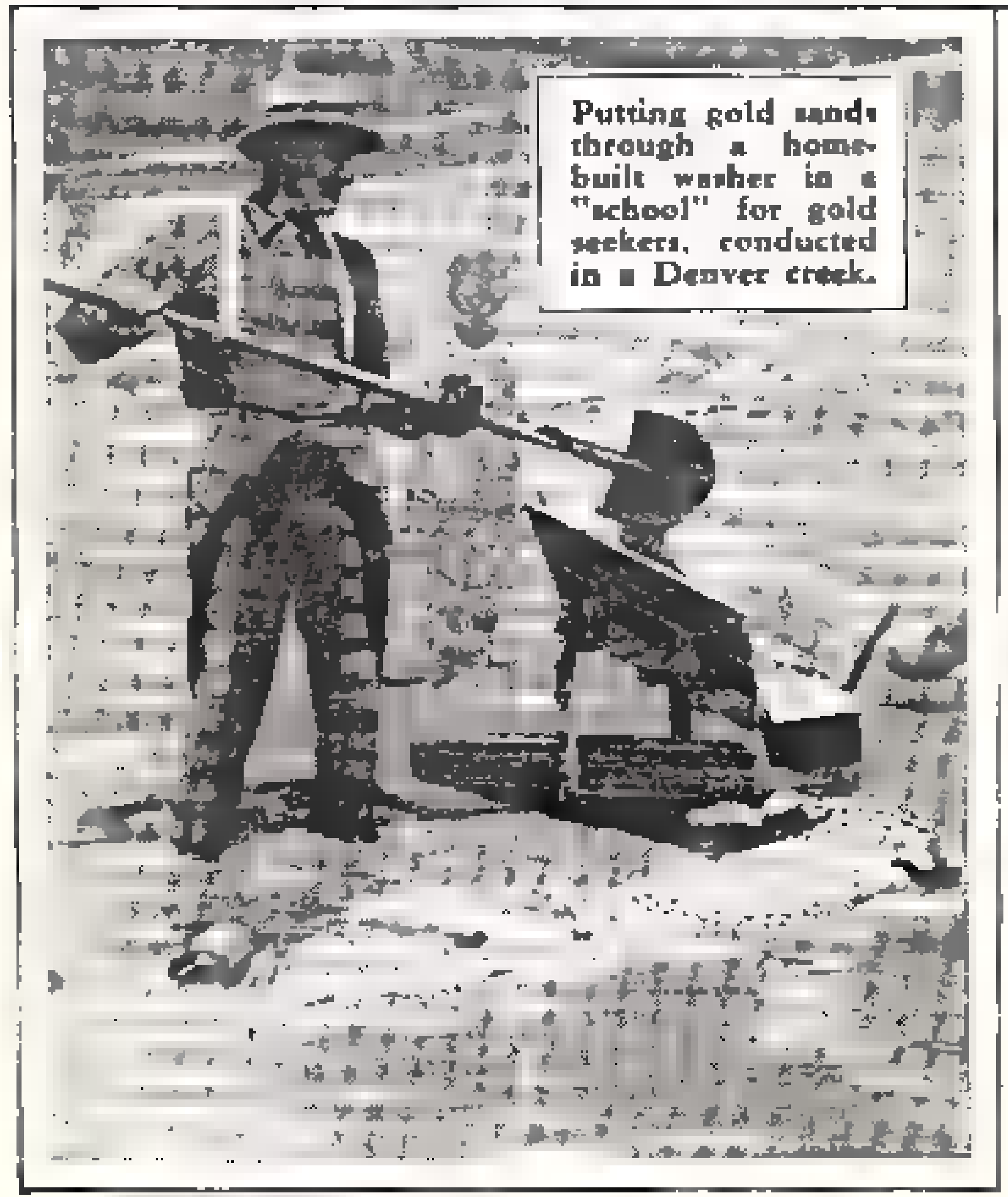
GOLD and HOW to FIND IT

by ARTHUR HAWTHORNE CARHART


BENCH PLACER BEARING GOLD
BAR BEARING GOLD


GOLD BEARING OUTCROPS IN MINERALIZED ZONE
WORK PLACERS BELOW THIS POINT. LOCATE "C" BY WORKING UP GULCH SIDES AFTER LOCATING HIGHEST SHOWINGS OF COLORS IN GULCH STREAMS
Ⓒ
Ⓒ
Ⓑ GOLD SIGNS STRONGER
BENCHES SHOW NO GOLD
STREAM SHOWS NO GOLD
Ⓐ
GOOD SHOWING. ROUGH GOLD. TURN UP SIDE GULCH. PLACERS BELOW "A" SHOULD BE WORTH WORKING, PARTICULARLY BENCHES
BAR WITHOUT GOLD SHOWING

Here's method by which prospector, using his gold pan as a tool, traces the color showings in a stream bed until he finally locates rich veins from which the gold has been washed down.



Putting gold sands through a home-built washer in a "school" for gold seekers, conducted in a Denver creek.

THE editor of MODERN MECHANIX AND INVENTIONS has asked me to write about the art of prospecting for gold and the amateur's chances of cleaning up in the new gold rush which has been growing during the past few months in our western states.

"You've carried a pack through the gold country of the Rockies," he said to me. "You know geology; you know the tricks of the trade and all about the hardships as well as the adventure and the chance of striking it rich. Give our readers a straight-from-the-shoulder account of what's what—the same sort of pointers and advice you would give if you could talk with each man face to face."

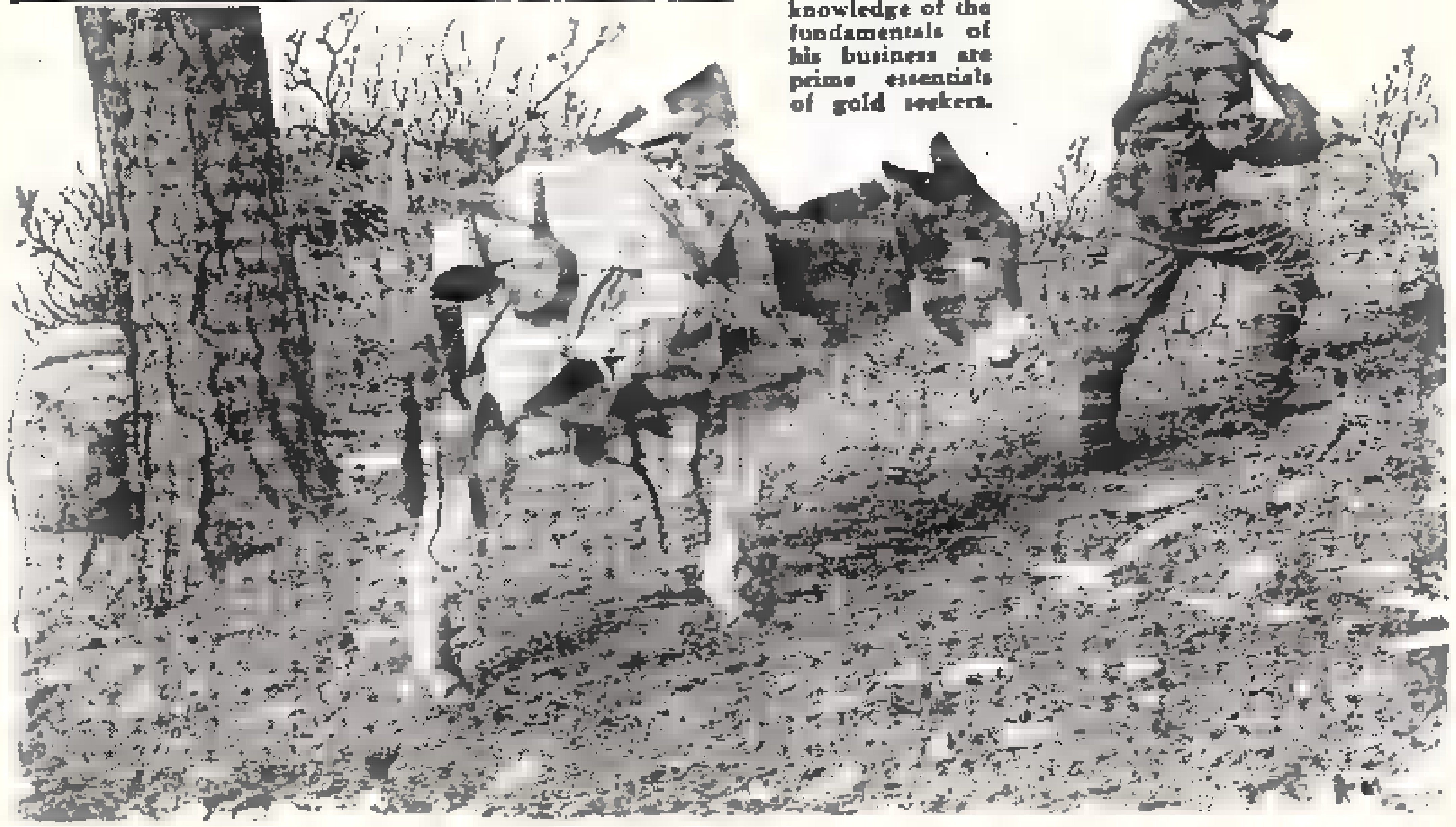
So here's the first of a series of articles on the subject of gold and how to find it which will run through several issues of the magazine.

First off, there *is* a gold rush on in our western mountains. Those who have made good wages and better have been those who knew what to look for, how to look, and where to look.

The old saying that "Gold is where you find it," is true only if the place prospected is a logical gold-bearing formation. Once on the right road and warned against blunders, the distance you may go depends largely on yourself.

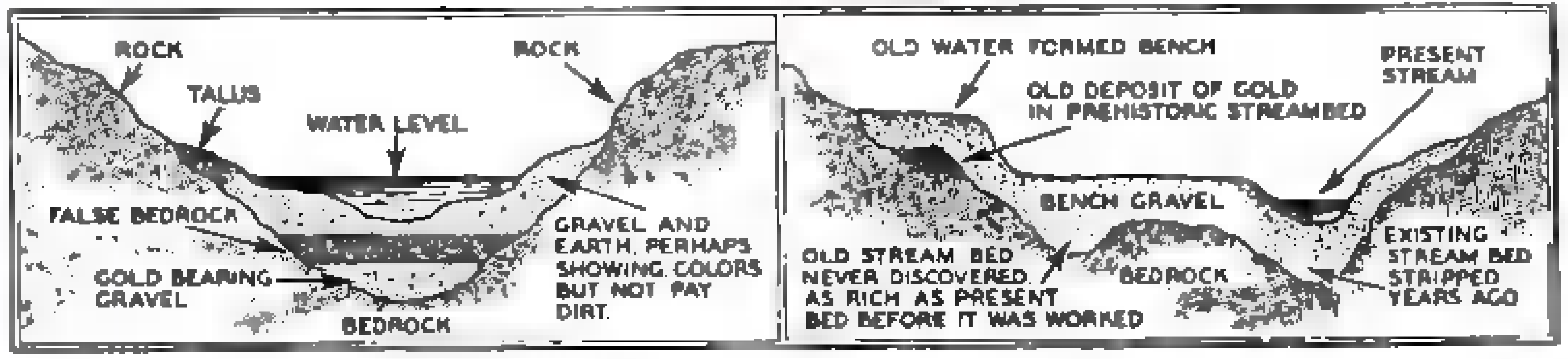
Mining is hard work. Average rewards are not high. The man who becomes rich from it is the exception. But there always is the chance of "hitting it rich" and this keeps luring the miner on.

Your health must be sound so you can rough it. You must have enough capital to get simple prospecting equipment and meet the cost of grub bills for a month or two. You may hit pay dirt right away or you may have to hunt. It is better to search a few weeks to get dirt that will pay well than be forced to struggle with ground that will return barely enough to live on. If you do not have sufficient funds some friend or group of friends may "grubstake" you; the grubstaker putting up funds, the miner furnishing time, labor and his knowledge with a 50-50



Sound health to withstand the rig[illegible] of roughing it, a minimum of equipment, and a knowledge of the fundamentals of his business are prime essentials of gold seekers.

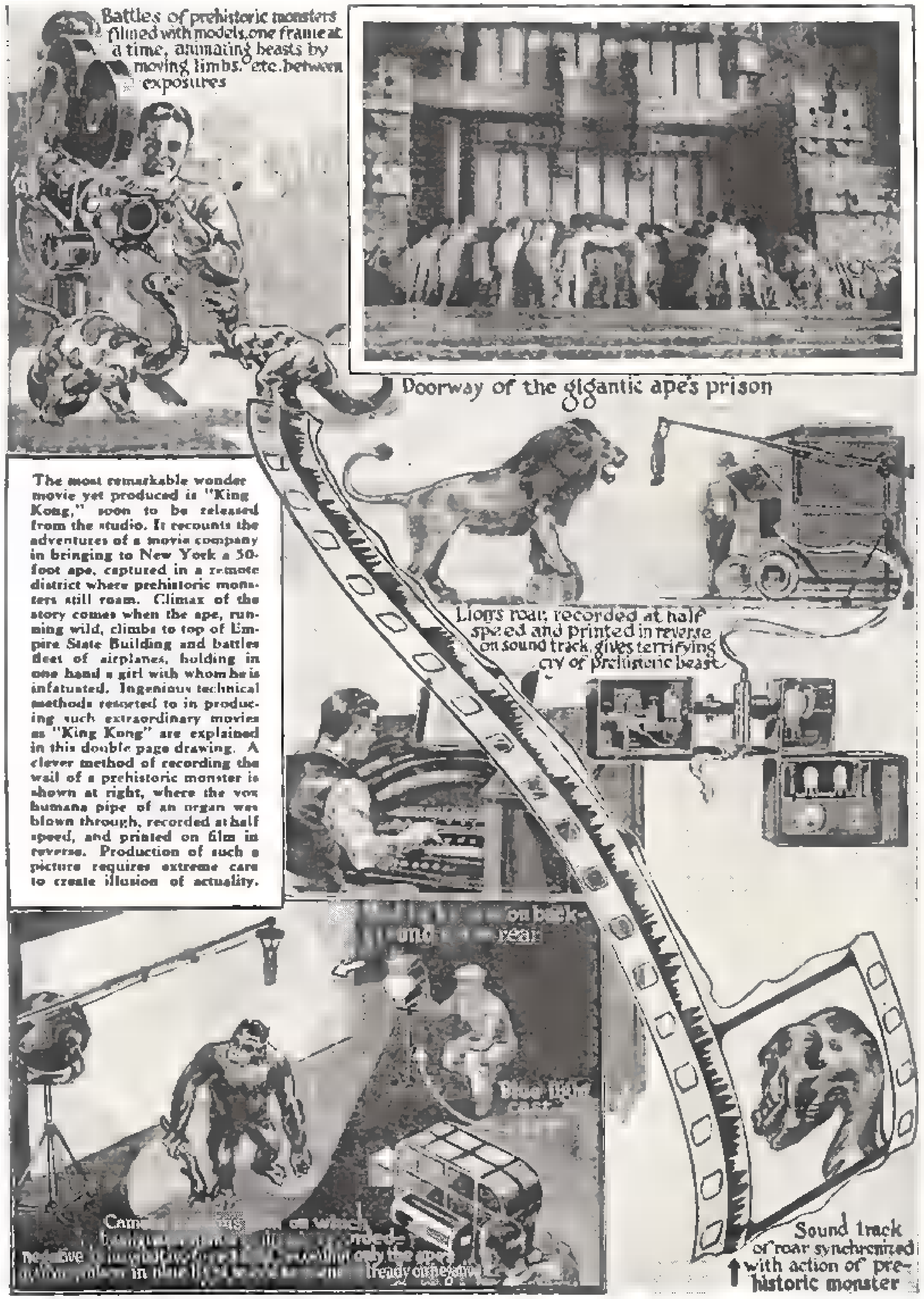
Typical gold country — The unworked "bench" at the left of the stream may be a rich placer working.

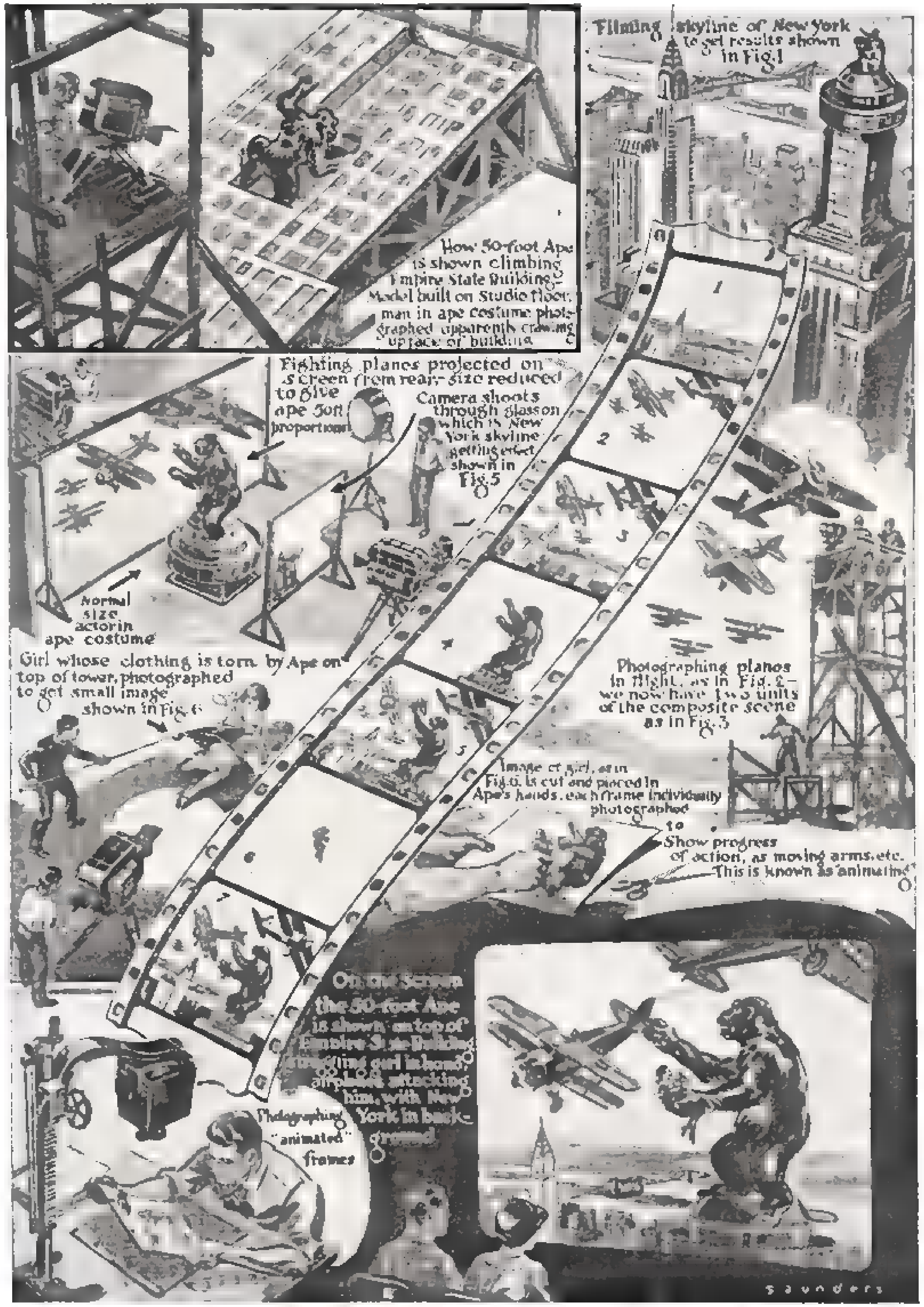

ROCK
TALUS
WATER LEVEL
ROCK
FALSE BEDROCK
GOLD BEARING GRAVEL
BEDROCK
GRAVEL AND EARTH, PERHAPS SHOWING COLORS BUT NOT PAY DIRT.
OLD WATER FORMED BENCH
OLD DEPOSIT OF GOLD IN PREHISTORIC STREAMBED
PRESENT STREAM
BENCH GRAVEL
OLD STREAM BED NEVER DISCOVERED. AS RICH AS PRESENT BED BEFORE IT WAS WORKED
BEDROCK
EXISTING STREAM BED STRIPPED YEARS AGO

The cross-section of a canyon shown at left above is a typical formation. To get real gold, you must go all the way to genuine bedrock. Drawing at right shows how rich deposits are sometimes discovered, even though the ground has been previously worked over. In bench placers, dig plenty of holes, testing down to genuine bedrock to prove your field.

Latest WONDER MOVIE is TECHNICAL MARVEL

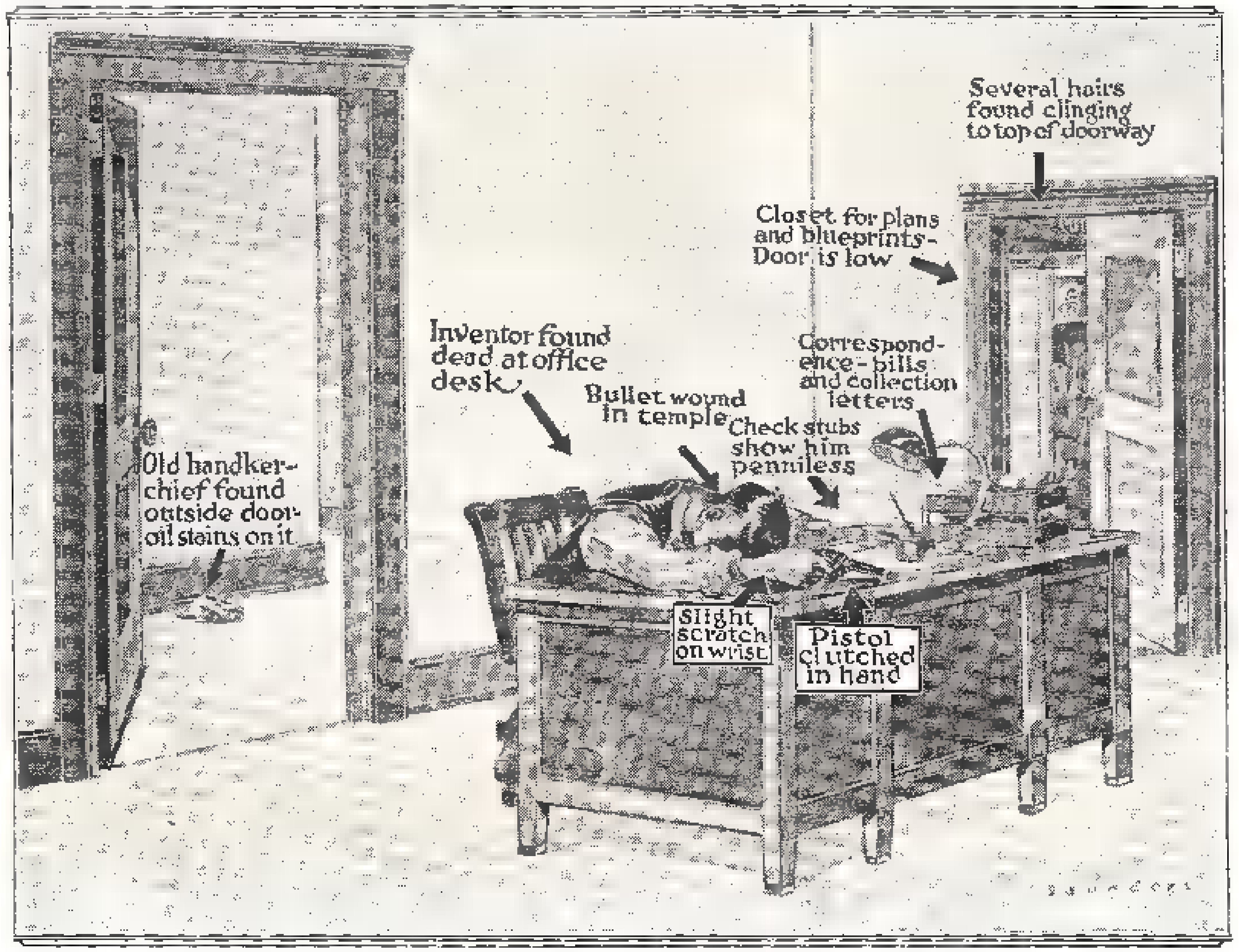
The most remarkable wonder movie yet produced is "King Kong," soon to be released from the studio. It recounts the adventures of a movie company in bringing to New York a 50-foot ape, captured in a remote district where prehistoric monsters still roam. Climax of the story comes when the ape, running wild, climbs to top of Empire State Building and battles fleet of airplanes, holding in one hand a girl with whom he is infatuated. Ingenious technical methods resorted to in producing such extraordinary movies as "King Kong" are explained in this double page drawing. A clever method of recording the wail of a prehistoric monster is shown at right, where the vox humana pipe of an organ was blown through, recorded at half speed, and printed on film in reverse. Production of such a picture requires extreme care to create illusion of actuality.


Battles of prehistoric monsters filmed with models, one frame at a time, animating beasts by moving limbs, etc. between exposures
Doorway of the gigantic ape's prison
Lion's roar, recorded at half speed and printed in reverse on sound track, gives terrifying cry of prehistoric beast
on back-
ground
rear
Blue light
cast
Camera
on which
negative
only the ape's
in blue light
ready on negative
Sound track of roar synchronized with action of prehistoric monster


How 50-foot Ape is shown climbing Empire State Building— Model built on Studio floor; man in ape costume photographed apparently crawling up face of building
Filming skyline of New York to get results shown in Fig. 1
Fighting planes projected on screen from rear—size reduced to give ape 50ft proportion
Camera shoots through glass on which is New York skyline getting effect shown in Fig. 5
Normal size actor in ape costume
Girl whose clothing is torn by Ape on top of tower, photographed to get small image shown in Fig. 6
Photographing planes in flight, as in Fig. 2— we now have two units of the composite scene as in Fig. 3
Image of girl, as in Fig. 6, is cut and placed in Ape's hands, each frame individually photographed to Show progress of action, as moving arms, etc. This is known as "animating"
1
2
3
4
5
6
7
On the Screen the 50-foot Ape is shown on top of Empire State Building struggling girl in hand, airplanes attacking him, with New York in background
Photographing "animated" frames
saunders

TAKE a LESSON from a Scientific Detective

by VICTOR EDWARD BARNES


Several hairs found clinging to top of doorway
Closet for plans and blueprints - Door is low
Inventor found dead at office desk
Correspondence - bills and collection letters
Bullet wound in temple
Check stubs show him penniless
Old handkerchief found outside door - oil stains on it
Slight scratch on wrist
Pistol clutched in hand

To test your ability as a scientific detective and your knowledge of recent advances in the field, [illegible] how closely you can figure out the course of procedure a scientific detective would follow [illegible] in examining the clues shown. Where would he look for fingerprints, how decide whether the [illegible] is murder [illegible] suicide? When you have done so—not before—turn [illegible] page 52 and read the answers. You [illegible] not expected to solve the crime—just decide what to do with the clues.

What do you know about the science of crime detection, aside from what you may have read in fiction? The author of this article gives you a chance to test your wits in solving [illegible] typical crime, then tells you how experts of the Scientific Crime Detection Laboratories would go about it.

UNLESS one has had the opportunity of working alongside the experts who are applying the resources of modern science to the ancient art of crime detection, the chances are that mention of a scientific detective conjures up pictures of a hawk-nosed individual with a magnifying glass and a supernatural ability to pluck amazing facts from thin air.

The magnifying lens still has its uses, but the scientific detective has lately learned so many new facts about his trade that even the man who was fully informed a year or so ago will have to make room in his mind for new ideas. Most of these advances have come from the Scientific Crime Detection Laboratory in Chicago, affiliated with Northwestern University, where [illegible] staff of experts is constantly at work.

They have learned, for example, that the age of a suspect can be determined within two or three years by a hair from his head; that the distance from which a murder shot was fired can be determined by a glance at the wound; that—

But let's take a sample crime and see how the scientists of the modern school of detection would solve it:

One Matthew Donaldson, aged inventor, is found dead at his desk in the little office-living room of his home. The fatal bullet wound is in the temple. Clutched in his hand is a pistol.

Dusted for fingerprints, the gun reveals only those of Donaldson. Ballistics tests show that the fatal bullet actually was fired by this gun, not by some other. Ballistics is the science of determining by markings left on the bullet in its passage through the barrel exactly what gun of all the millions in existence fired that particular slug. No two gun barrel interiors leave identical marks on their bullets, just as no two individuals' fingers leave identical prints. You get your death bullet, fire a test bullet from the suspected weapon, and if that test bullet's markings are the same as those on the death bullet, then beyond all doubt the suspected weapon did fire the fatal shot.

Distance between lines indicates age of subject

Magnified 400 times, the above view of a human hair shows the cuticular scale or outer covering, spaces between whose edges vary according to age of subject, enabling age of unknown suspect to be determined within two or three years. At right, police agent from India studying firearms at Scientific Crime Detection Lab.

Murder or Suicide?

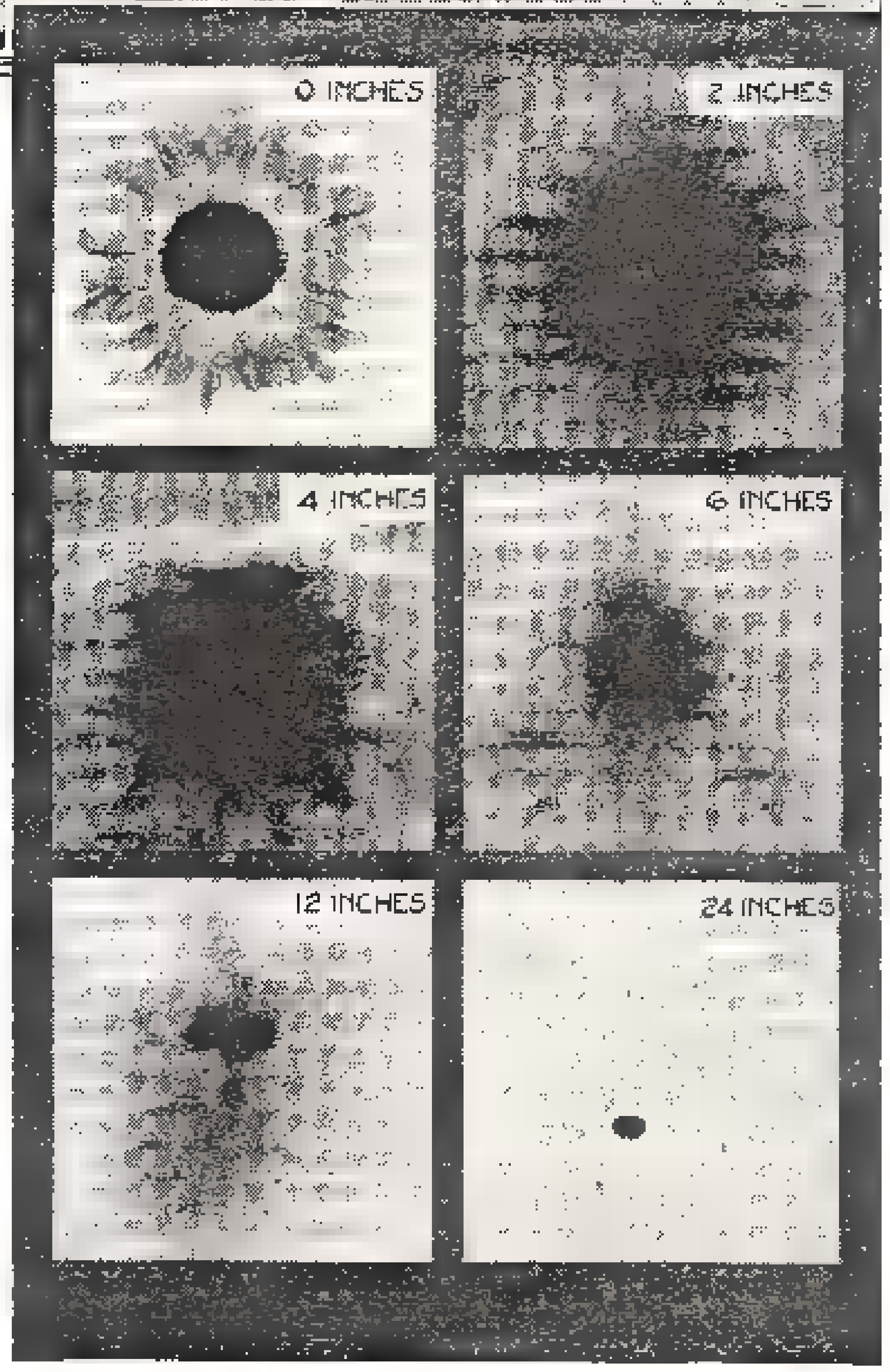
Correspondence in the inventor's desk shows that creditors have been hounding him for payment. One letter, from his bank, threatens foreclosure of a mortgage on his home and shop, all he owns, if he does not at once repay an overdue loan. His check stubs show that he is penniless. Apparently a clear case of suicide by a man grown desperate in a losing struggle.

But scientific detection, having already identified the death gun, steps in again. The gun seemed just *too* clean, aside from the victim's fingerprints.

Microscopic examination reveals tiny cotton fibres clinging to it. The gun has been wiped clean. By whom? And why?

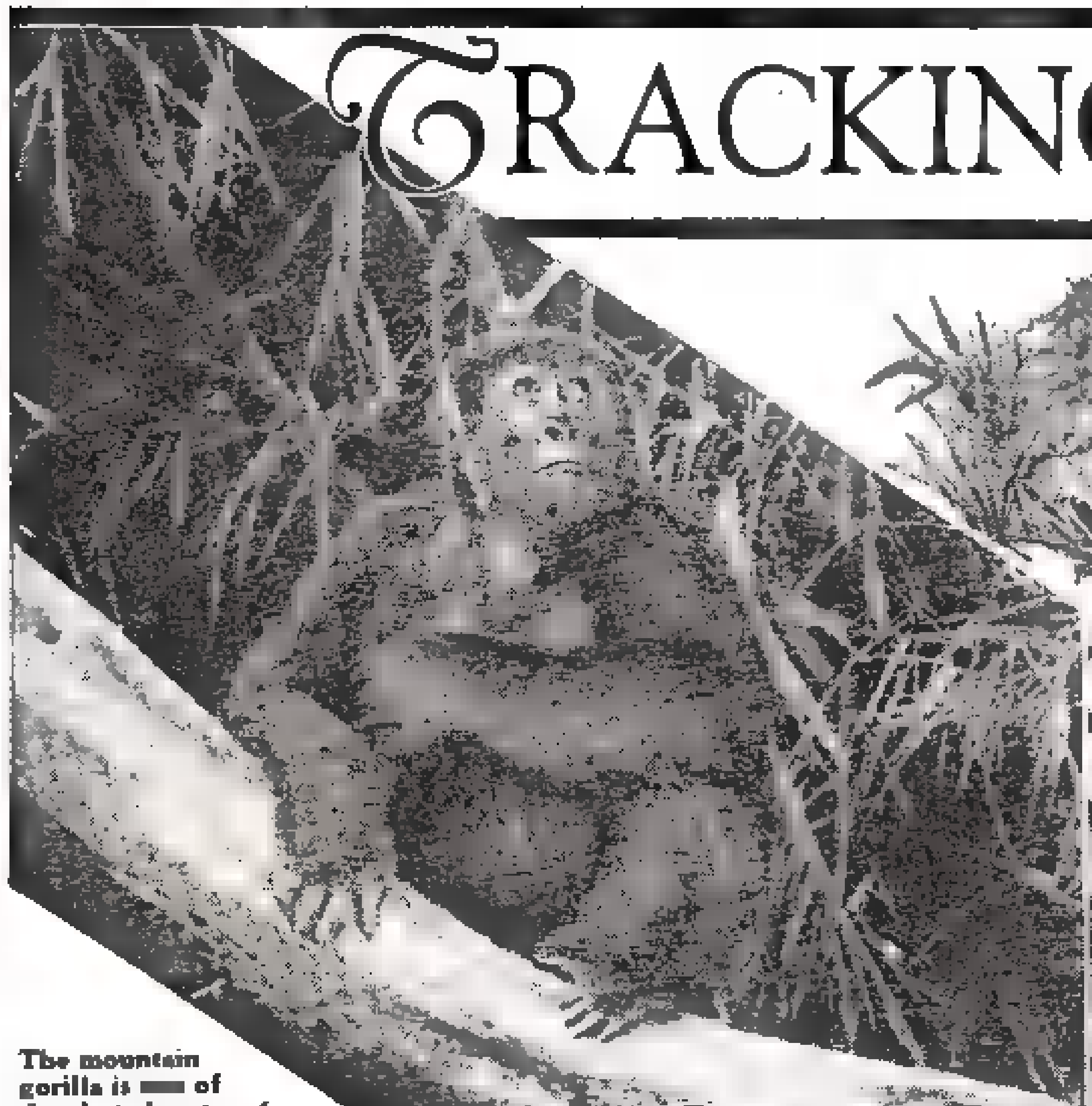
The gun numbers have been filed away. This can only be an effort to prevent tracing of this gun. But if the inventor intended to commit suicide, why bother about that?

An inspection of the flesh around the temple wound settles it all. The inventor



How burn patterns around bullet wounds vary with range and types of powder and guns used. From study of charts like these, the scientific detective can determine at a glance from what distance bullet was fired and what kind of [illegible] nition was used. Background squares are of white paper.

TRACKING Down the Mountain GORILLA



The mountain gorilla is [redacted] of the last beasts of mystery. This remarkable [redacted]era shot surprised a man-like giant of the jungles in the act of crossing [redacted] fallen log.

Broad back of a gorilla that narrowly missed killing a native guide. Note the massive shoulders. This specimen weighed 380 pounds, mostly muscle.

Peculiar gait of the gorilla is shown in this unusual action picture.

Thrilling experiences [redacted] African adventure trail with Dr. Harold C. Bingham, as told

by JAMES NEVIN MILLER

OF ALL the weird yarns told about Africa probably none rival for sheer drama and thrills the recent experiences of Dr. Harold C. Bingham, famous explorer for the Carnegie Institution of Washington and Yale University. For three months Dr. Bingham and his wife, aided only by a handful of native guides and interpreters, lived shoulder to shoulder among the mysterious mountain gorillas that inhabit the northeastern part of the Belgian Congo, a region so densely jungled that for the most part the explorers literally had to chop their way through bamboo thickets almost as big around [redacted] the average man's waistline.

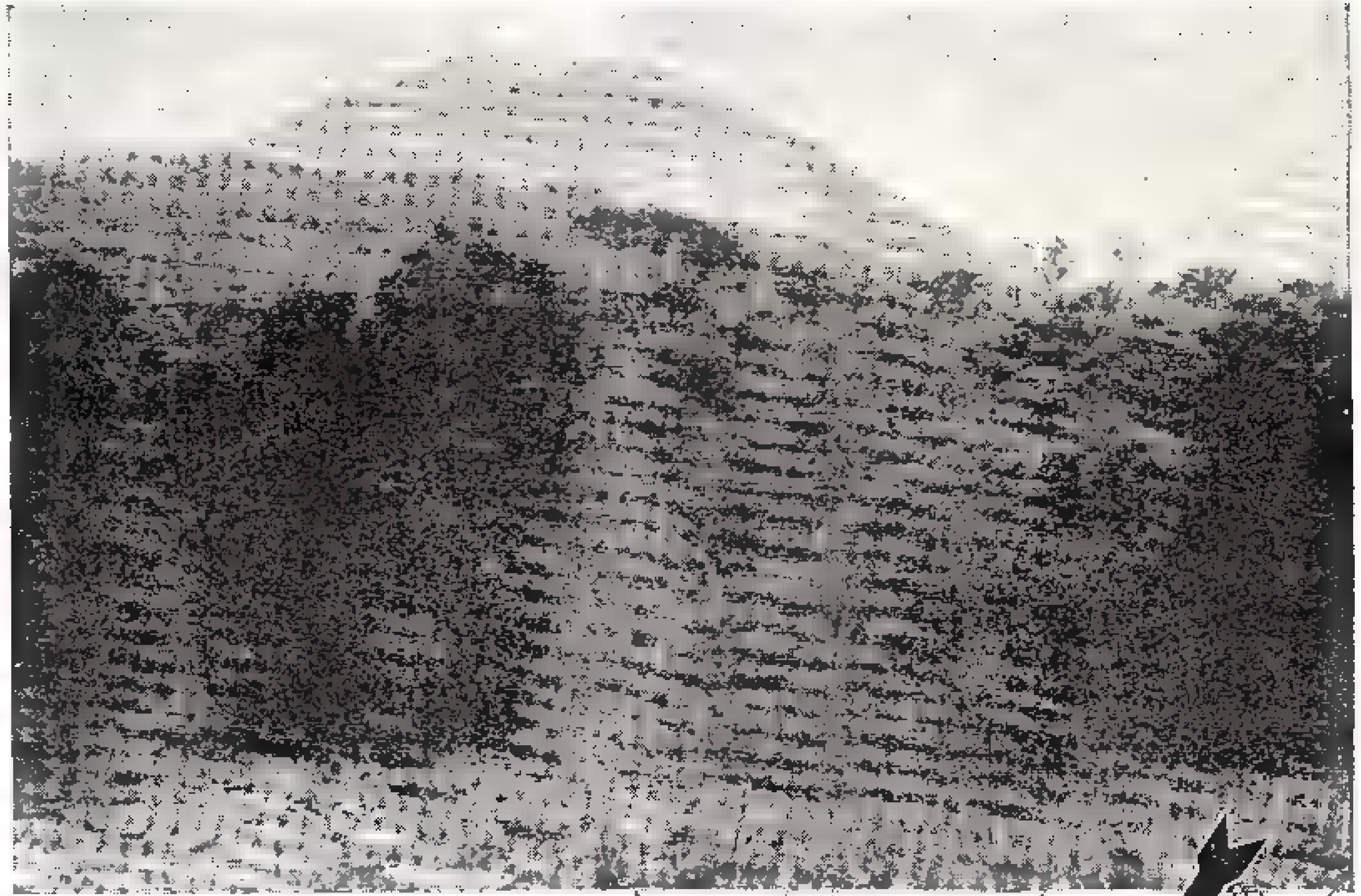
It was this remote section of the globe that gave birth to the many fantastic tales, re-told again and again in fiction and in film, to the effect that giant apes would carry off any white woman that dared invade the region.

Here, too, it was that Carl Akeley, noted naturalist, breathed his last, back in 1926, a prey to the death-dealing jungle fever that has ended the distinguished career of many an investigator of the Dark Continent's cherished secrets.

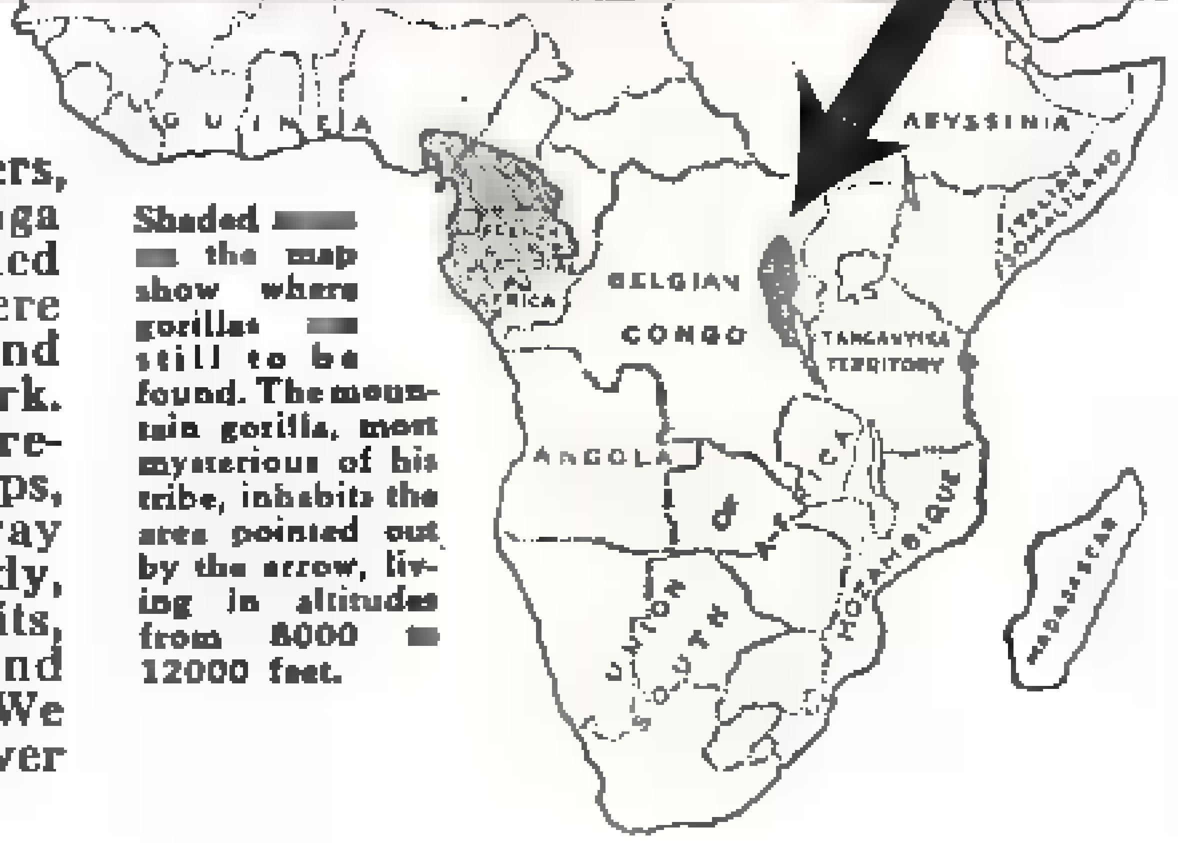
On one occasion during the Bingham exploration, an infuriated charge by a gorilla weighing close to 400 pounds, came within a hair of exterminating Mrs. Bingham and a native guide. But let the daring explorer tell his own story:

"Following the advice of government officials, we made Lulenga the base for our field supplies. Whereupon, my wife and myself, with native guides, gun bearers, personal boys and 40 porters, left Lulenga for a three days' climb up the wooded slopes of Mount Mikeno to Kabara where we established our first field camp and remained for our first month of work.

"During this period we were in frequent contact with various gorilla groups, following them as they fed their way along, carefully recording for future study, observations on the nests, feeding habits, social responses, nomadic behavior, and the individual traits of the animals. We took moving and still pictures whenever conditions favored."



Mt. Karasimbi, home of mystery. In bamboo belt which encircles this volcano, the mountain gorilla is found.



Shaded [redacted] the map show where gorillas [redacted] still to be found. The mountain gorilla, most mysterious of his tribe, inhabits the area pointed out by the arrow, living in altitudes from 8000 [redacted] 12000 feet.

Three Paces From Death

Now comes the big thrill of the expedition—the experience with the giant ape which came within [redacted] hair of exterminating the explorer's wife and [redacted] native guide. Mrs. Bingham takes up the narrative:

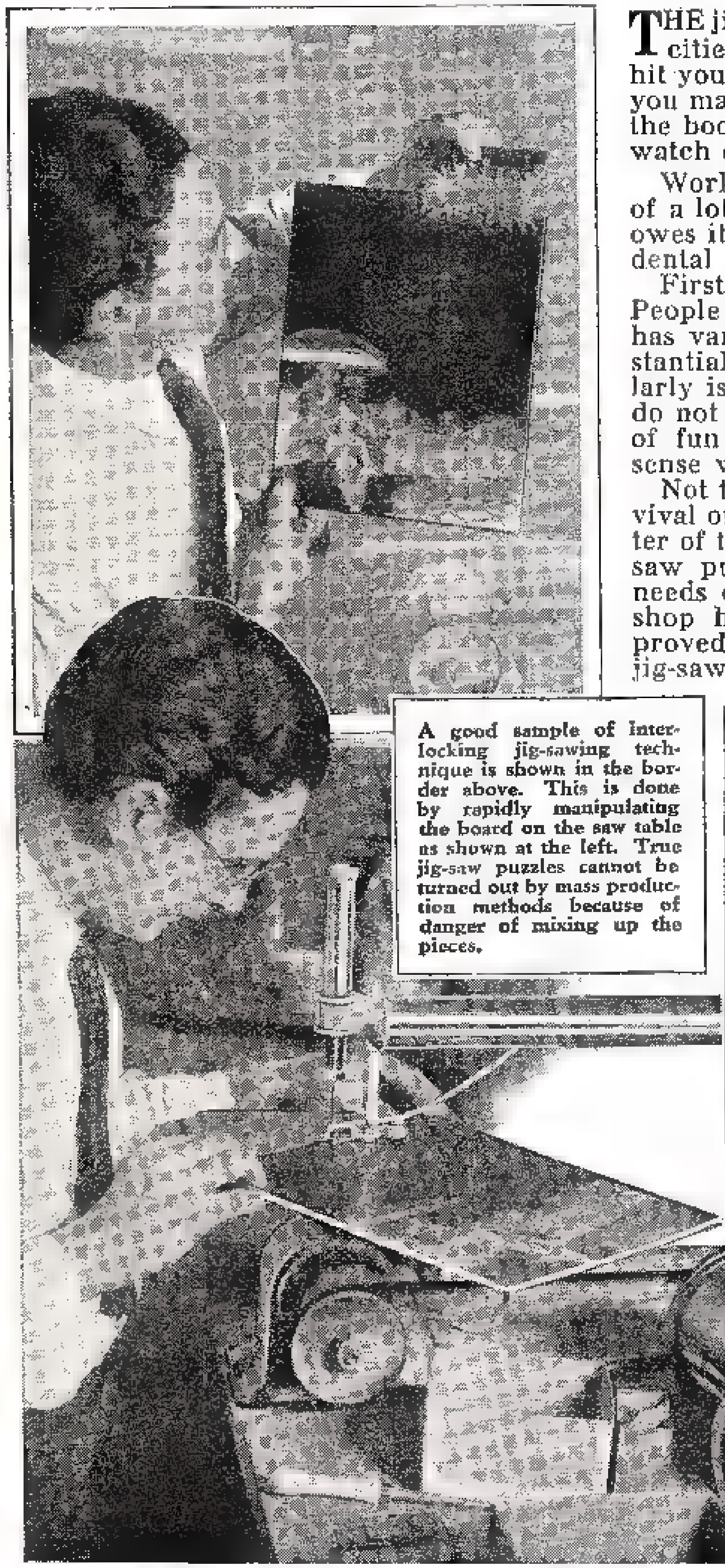
"One afternoon we followed a band of gorillas which we had observed and filmed the day before. When they had retreated beyond range of our cameras we packed up all photographic equipment and started for camp. We had not gone far when we heard what sounded like a gorilla on a ridge above us and at our left. The natives said the gorillas were going towards Karasimbi and that we should go towards Mikeno, although the trail had pointed towards Mikeno from the line the animals had left their nests that morning.

"Following the guide's lead down the slope, we made a wide circle from the place where we last heard the gorillas. As we climbed the next ridge the guide paused to look at a freshly-rooted lobelia (a growing plant) and to say something about 'ngagi, ngini' (gorillas again).

"We had gone only a short way through vegetation when a gorilla yelled. The guide stopped, whirled about and fled. Mr. Bingham called for me to come back, which I turned to do, but had taken only a step or two when he commanded 'get out of the way.' I pushed into the wild

JIG-SAW CRAZY

How Jig-Saw Puzzles are made and what makes you like them



THE jig-saw puzzle craze has hit the larger cities and towns with a bang. If it hasn't hit your community yet, it will, and while you may be a scoffer today, the fever, like the boogey man, will get you if you don't watch out.

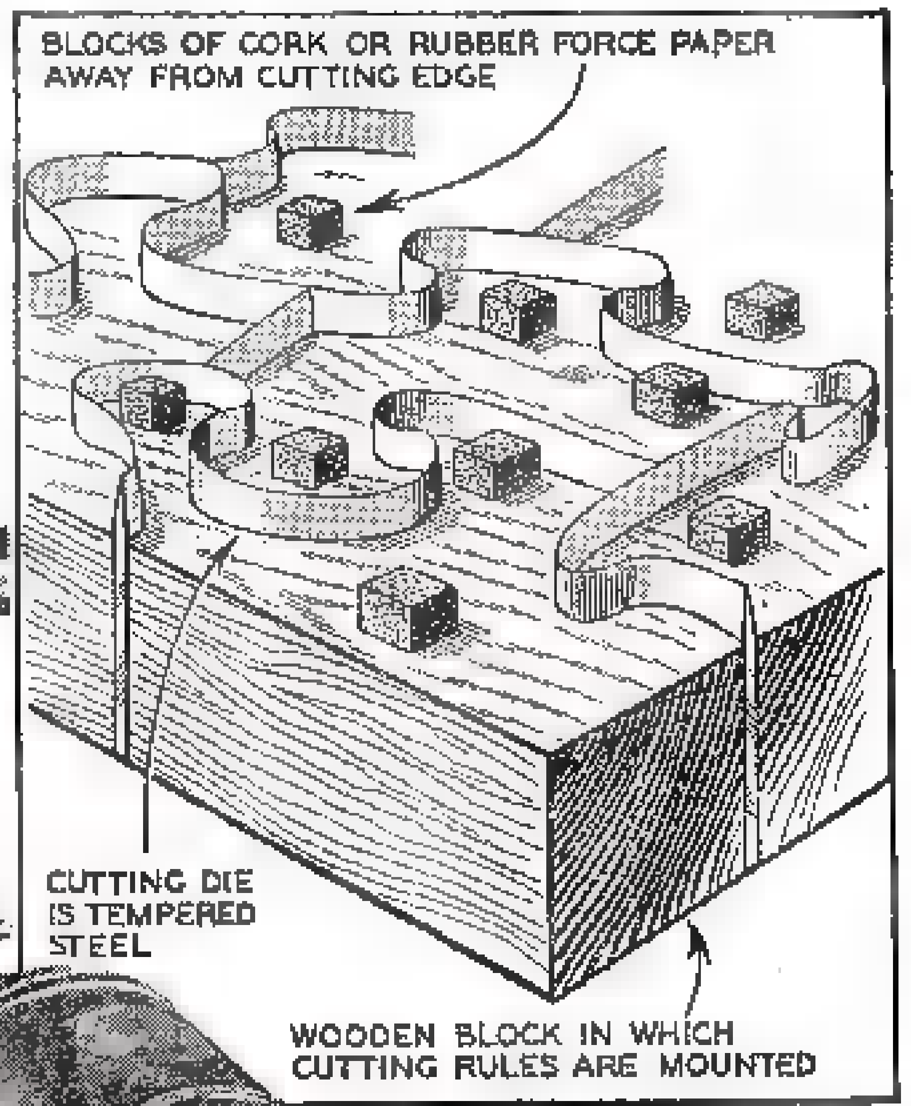
Working a good jig-saw puzzle is a whale of a lot of fun. Psychologically the vogue owes its popularity to a number of coincidental circumstances.

First there is the matter of the depression. People are "sick of it all." The old order has vanished, and the simpler, more substantial pleasures are welcomed. Particularly is this true of jig-saw puzzles which do not cost much, and yet which are a lot of fun because they satisfy the creative sense which is inherent in each of us.

Not the least important factor in this revival of an old nursery pastime is the matter of tools used in the manufacture of jig-saw puzzles. Companies catering to the needs of the man who has a home workshop have brought out a variety of improved machines ranging from elaborate jig-saws costing hundreds of dollars down to small units selling for slightly more than a dollar. No depression in this business!

One of the recent innovations was a very aptly conceived jig-saw that allowed the blade to travel in an absolutely vertical line. This saw was capable of the finest work, and rental libraries took advantage of the need for increased revenue by renting out elaborate puzzles which could be so beautifully cut with this new saw. Shortly the craze spread. It struck a fundamental chord everywhere. And where it hasn't yet struck, there is a vein of gold to be worked by the enterprising man with home equipment of this nature.

A good sample of interlocking jig-sawing technique is shown in the border above. This is done by rapidly manipulating the board on the saw table as shown at the left. True jig-saw puzzles cannot be turned out by mass production methods because of danger of mixing up the pieces.


BLOCKS OF CORK OR RUBBER FORCE PAPER AWAY FROM CUTTING EDGE
CUTTING DIE IS TEMPERED STEEL
WOODEN BLOCK IN WHICH CUTTING RULES ARE MOUNTED

Above you will see the method by which the cardboard type of jig puzzle (often miscalled jig-saw puzzle) is made. The pieces are large and cannot be made as intricate or small as wooden puzzles that are actually sawn out. A thick block is [illegible] to pattern, the rule laid in, and small corks spotted [illegible] eject the paper after cutting.

How Jig-Saw Puzzles Are Made

The jig-saw puzzle is simply a picture mounted on ⅛" plywood board which is sawed into intricate shapes. Each piece naturally fits the other, and when they are all separated, the reassembly is often very difficult. It is always engrossing.

The picture is mounted on the thin wood panel, and hot glued to the surface by brushing out the bulges with a stiff brush. As the plywood will warp, it is best to allow the wood and glue to dry under weights. Then the sawing will be easier.

When the puzzle has dried, it is trimmed in a bandsaw or other fine saw to within one-eighth inch of the final border. On a sanding disc the edges are brought to a smooth, square trim.

Then the jig sawing is the next step in manufacture. With a large puzzle the thing is sawed in interlocking curliques along the border. As the strips are sawed off, they in turn are sawed into small interlocking pieces. By shellacking the back of the puzzle the fine blade of the jig-saw will not splinter the wood, and no extra sanding is required, which is quite an item when it is considered that the puzzle may contain from fifty to five hundred pieces or more.

Making Money Is Easy

There are several plans by which the home workshop puzzle fan may make money with a jig-saw.

One of these is the rental system, which followed the original or outright sale idea. It costs commercially about a cent a cut to turn one of these out, and a five hundred piece puzzle usually retails at around $7.00. In renting through rental libraries, 25c to 50c a day (according to size) will soon return the cost of the puzzle. The usual agreement with the library is to rent puzzles on a fifty-fifty basis.

New forms of the picture puzzle are con-

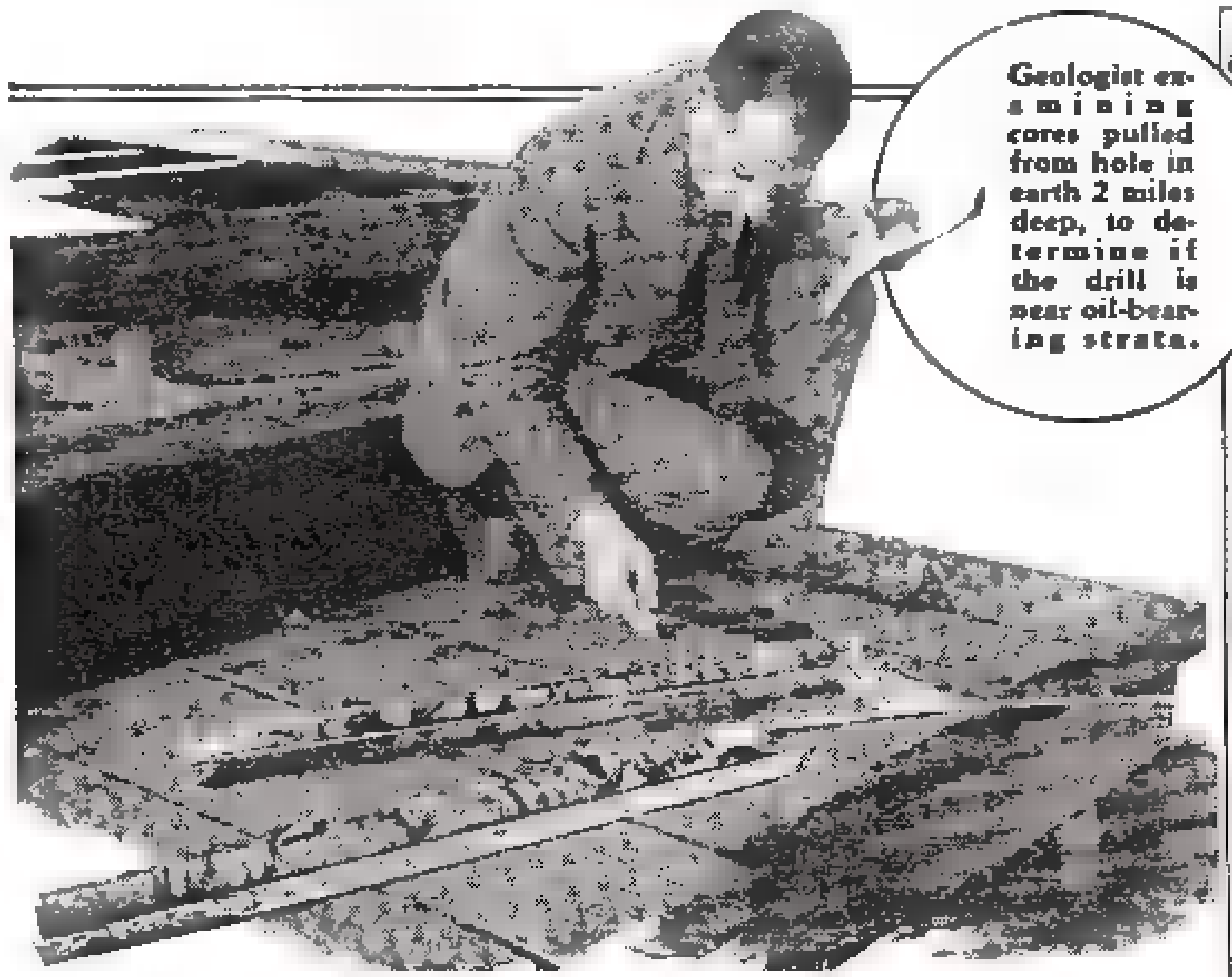
The picture is brushed out flat with a very stiff brush in this manner.

After gluing, the picture boards are weighted down with a castiron slab or other heavy object. This prevents warp. When dry, the board is ready to be put through the jig-saw under the manipulation of a skilled operator.

Strange New FACTS About the EARTH

by JAMES BOWLES

Cores of stone pulled from holes two miles deep, holding in their petrified hearts the spatterings of ancient raindrops, tracks of dinosaurs, and skeletons of strange creatures long vanished from the world, tell strange tales on Mother Earth. Read here how geological detectives look back into the dawn of history.



Geologist examining cores pulled from hole in earth 2 miles deep, to determine if the drill is near oil-bearing strata.

At right, core being forced from core barrel into tin trays, by water pressure. This core is a section of [illegible] as long [illegible] 50 city blocks!

Lowering the drill pipe into the hole. The core barrel is fastened onto the lower end of the drill pipe and bites its 30-foot core far below the surface, whence it goes to laboratories where it is examined microscopically by geologists.

OLD mother earth rumbled, shivered ever so slightly—then belched high into the air millions of tiny but perfect little shells. Several score people stood by curiously as the deep well in the Buttonwillow field, California, began to blow out hundreds of thousands of cubic feet of gas and many fossils.

Millions of years ago these tiny animals gave up their lives that each might contribute a drop of oil to today's supply. And now they were literally raining on the hats and shoulders of the crowd.

Seldom does man have an opportunity to see these age-old animal fossils close at hand, for they usually are buried far below the earth's surface and emerge only when some drilling crew brings them to light of day that a paleontologist may study them under powerful microscopes, thereby to determine the oil-bearing possibilities of a new field.

Geologists today are pulling the inside out of the earth exactly as a housewife lifts the center out of a doughnut. Sometimes they pull these cores from a well as deep as two miles.

And what do they find?

Footprints left there by dinosaurs and sabre-tooth tigers, perfect casts of backbones and tail fins of long-extinct fish, leaves from ancient trees, clam shells, fragments of wood, fish scales and the shells of marine animals so minute that they reveal their identity only through the microscope.

Yet these imprints in the rocks composing the earth's crust today enable geologists to turn back the pages of history far beyond man's former horizons of knowledge, revealing to them exactly how the earth's outer crust was formed.

Fossils they may be, but they're more accurate in the tales they tell than could be any human historian!

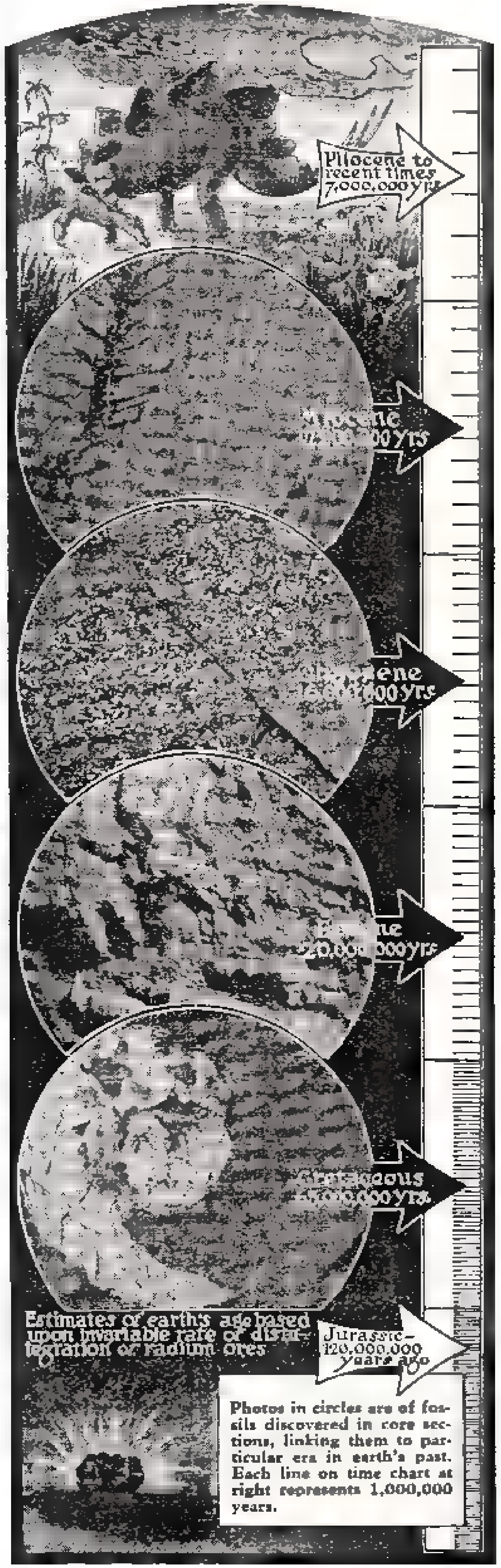
These long cores, little thicker than your wrist and longer than fifty city blocks, come to the surface in thirty-foot sections in core barrels fastened to the end of drill pipe. Once above ground, they are forced in yard-long segments into shallow metal troughs. Water, pumped under terrific pressure, accomplishes this.

These cores are usually examined in great detail, first under a hand lens, then under a microscope. Coarse and fine sands, clays, shales, limestones and conglomerates, all are readily recognized and the larger fossils, fish scales, wood fragments and like historical specimens are classified.

Frequently, though, the cores contain an abundance of smaller fossils that look like tiny white pin points to the naked eye. Through a hand lens they appear as definitely recognized shells, but their identity cannot be further determined until they are washed out of the core, mounted on slides and examined under a high-powered microscope. Then the tiny lines and shadows reveal their former identities as definitely as a fingerprint tells on its owner.

Oil experts collect these fossils as they come from holes bored deep into the earth. These men, skilled in interpreting these fossils, sometimes through no more than the impress of a delicate leaf, classify the fossils through an elaborate system of names.

"We have found from our studies of fossils collected from thousands of feet of rock layers that the character of life has undergone a gradual and systematic change from early geologic time to the present," said Desaix B. Myers, chief geologist for the Union Oil Co., of California.



Pliocene to recent times 7,000,000 yrs
Jurassic—120,000,000 years ago

Estimates of earth's age based upon invariable rate of disintegration of radium ores

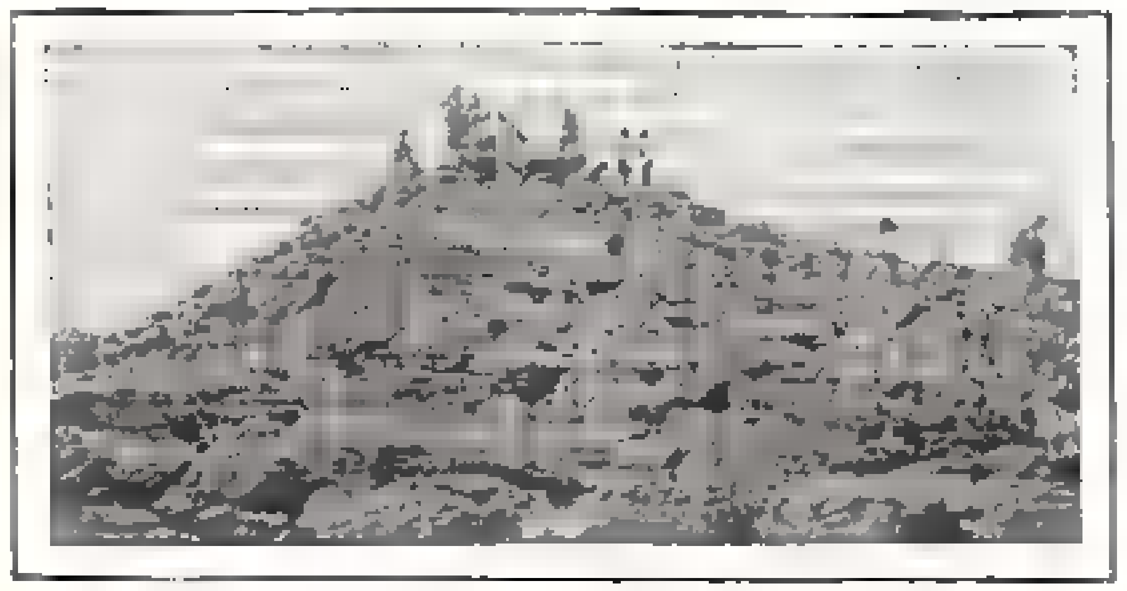
Photos in circles are of fossils discovered in core sections, linking them to particular era in earth's past. Each line on time chart at right represents 1,000,000 years.

BLUE RIBBON Records of the WORLD'S Weather

This weather station in Death Valley, Cal., registered 134° in the shade in 1913, but in 1922 the record was beaten by Azizia, Tripoli, where temperature of 136° was recorded.

Weather station at Cherrapunji, famous for many years as the rainiest spot on the globe.

At this spot, Opid's Camp, California, fell the heaviest brief shower ever measured—1.03 inches in a minute!



On this peak of Mt. Washington, New Hampshire, was hung up the world's record for a measured wind—186 miles per hour!

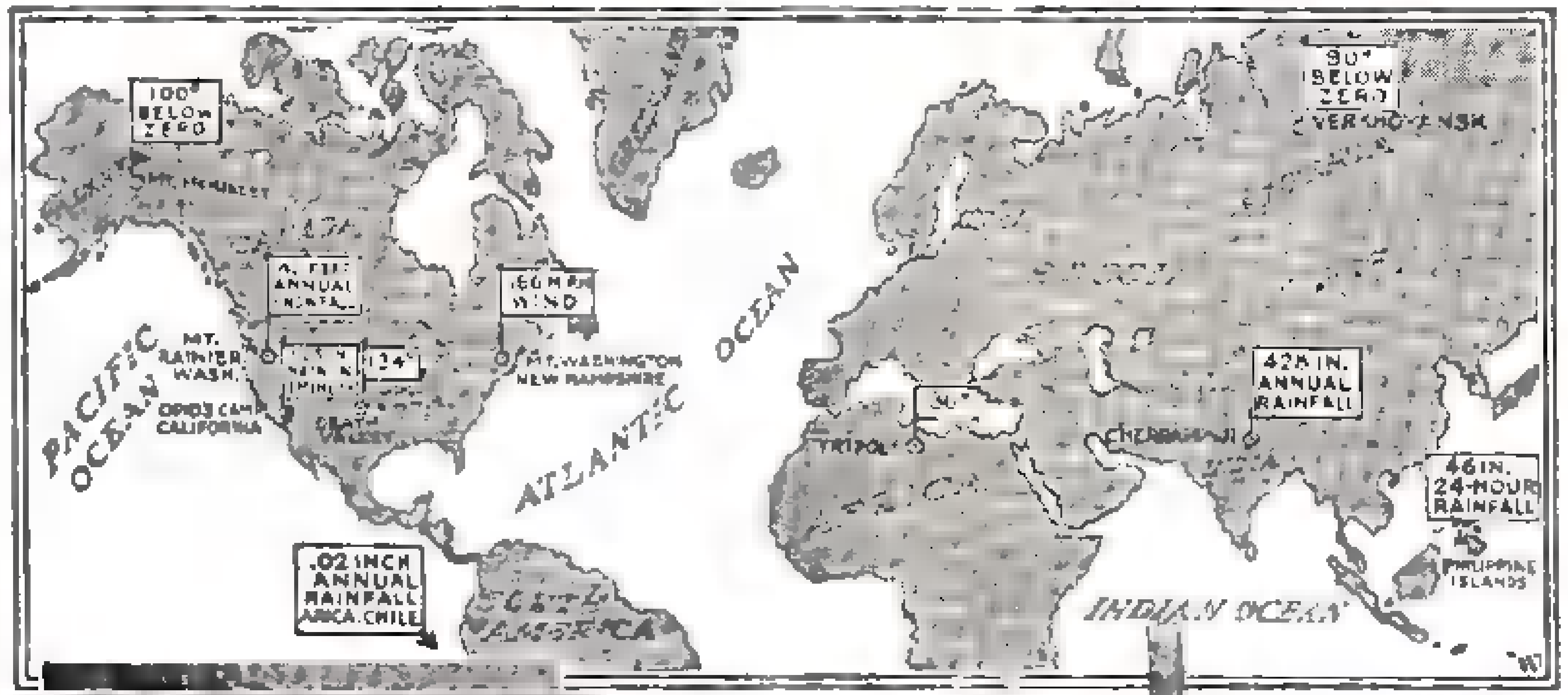
THE world's hottest weather does not occur near the equator, or in the torrid zone, but in subtropical deserts of the north temperate zone, in summer. The Weather Bureau station at Greenland Ranch, Death Valley, California, registered 134 in the shade on July 10, 1913. This remained a world record until September 13, 1922, when 136 was registered at Azizia, 25 miles inland from the city of Tripoli, in northern Africa.

The lowest temperature ever observed at a regular meteorological station was 90 below zero, on February 5 and 7, 1892, at Verkhoyansk, Siberia, which lies only one degree of latitude north of the Arctic Circle.

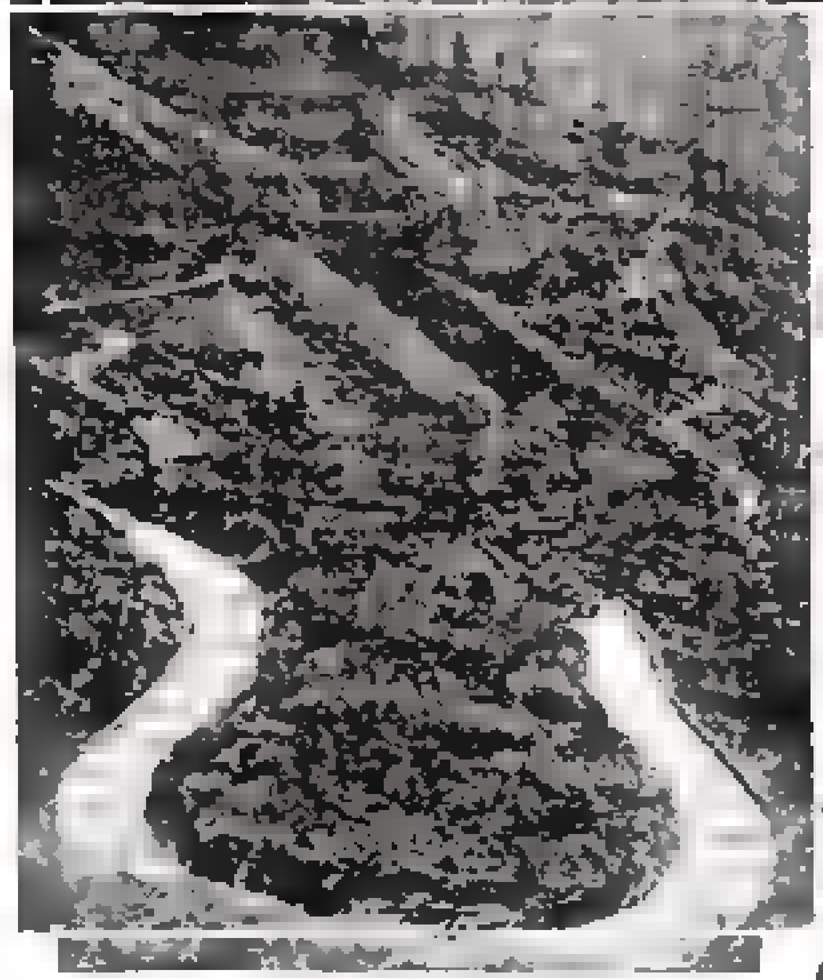
The famous minimum thermometer that the late Archdeacon Hudson Stuck cached on Parker Pass, 15,000 feet up the slope of Mount McKinley, Alaska, in June, 1913, was recovered last May by the Lindley-Liek expedition. Its index had gone beyond the lowest gradation on the scale and into the bulb, indicating a minimum temperature, some time during the 19 years the instrument lay on the mountain, at least as low as 100 degrees below zero—possible lower!

The heaviest mean annual rainfall obtained from a long and trustworthy series of measurements is 428 inches a year (about ten times the average for New York City) at the village of Cherrapunji, 4,300 feet above sea level, in the Khasi Hills district of Assam. The lightest is 0.02 inch a year at Arica, Chile.

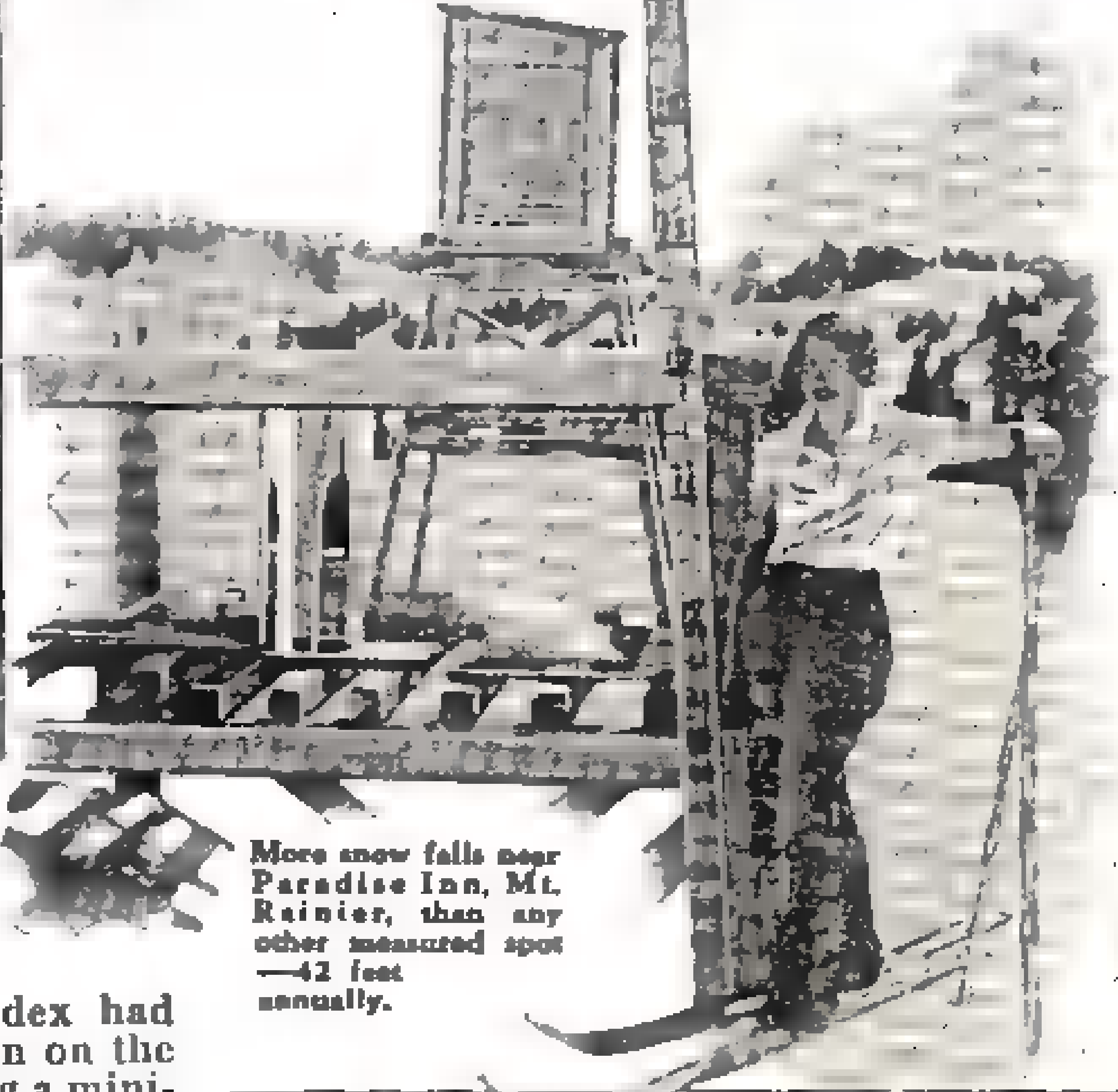
The heaviest 24-hour rainfall on record was 46 inches, falling from noon, July 14, to noon, July 15, 1911, at Baguio, the mountain health resort and former "summer capital" of the Philippines.



100° BELOW ZERO
MT. MCKINLEY
ANNUAL SNOWFALL
186 M.P.H. WIND
MT. RAINIER WASH.
134°
MT. WASHINGTON NEW HAMPSHIRE
OPID'S CAMP CALIFORNIA
DEATH VALLEY
PACIFIC OCEAN
ATLANTIC OCEAN
.02 INCH ANNUAL RAINFALL ARICA, CHILE
SOUTH AMERICA
90° BELOW ZERO
VERKHOYANSK
136°
TRIPOLI
CHERRAPUNJI
428 IN. ANNUAL RAINFALL
46 IN. 24-HOUR RAINFALL
PHILIPPINE ISLANDS
INDIAN OCEAN



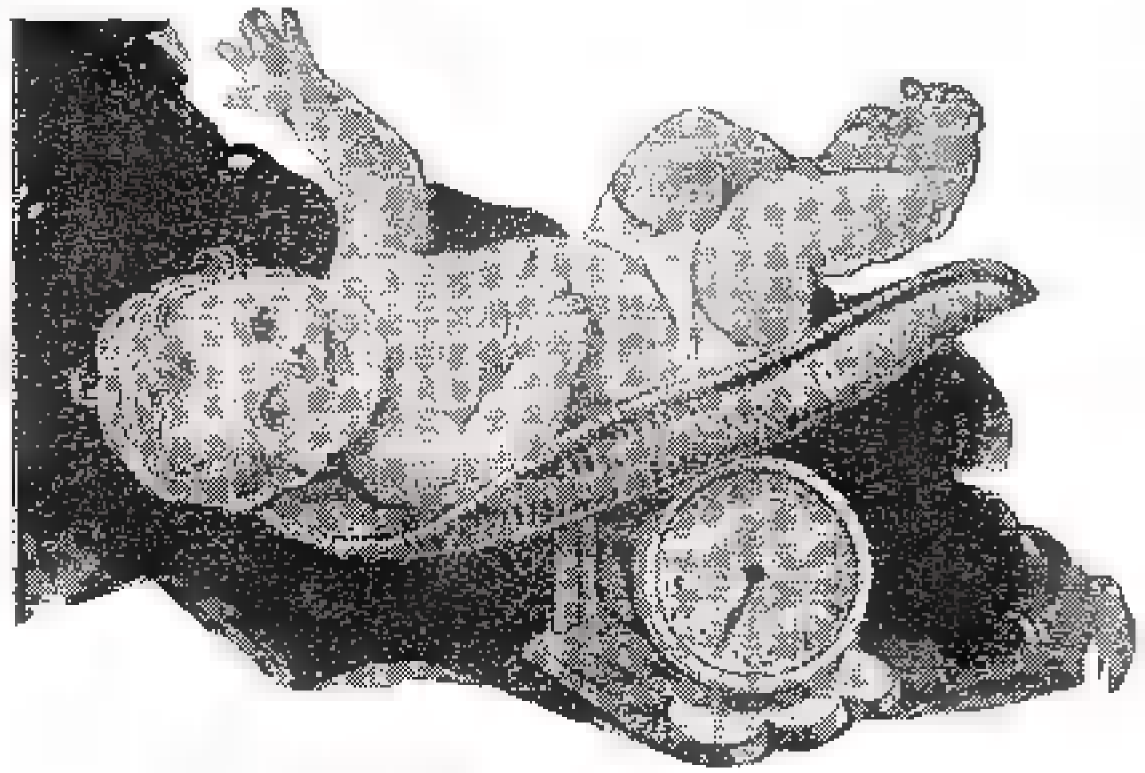
This famous Benguet road in the Philippines was practically wiped out by the world's heaviest 24-hour rainfall—46 inches. Map at top shows distribution of weather records.



More snow falls near Paradise Inn, Mt. Rainier, than any other measured spot—42 feet annually.

Recovering the famous minimum thermometer cached on Mt. McKinley, Alaska, which recorded temperatures lower than 100 degrees below zero, over a period of 19 years.

1000 WAYS to MAKE a LIVING



Money-making ideas shown in these pages, which will appear each month in Modern Mechanix and Inventions until ■ thousand items have been printed, are contributed by readers who have found them life-savers in time of need, when income shrank through loss of job ■ other reasons. The first installment of these ideas appeared in the March issue.

Renting Baby Scales

IN GOOD sized communities money can be made through establishment of ■ baby scales rental service. You can either purchase scales or arrange with a hardware or scales store to use used scales for such service. The common rental price is from $4 to $5 for a six months' period. One woman in a city of 250,000 population has seventy-five sets of scales in such service steadily. Frequently sales of scales can be made at a commission, or profit if you own the scales, when the rental period expires. Customers can be found easily by daily watching of the "births" column in the daily paper and use of postal cards or telephone ■ very few days after appearance of the announcement.

Home Library Service

A MIDDLE aged woman who had had ■ flourishing tutoring business in French found herself with curtailed clientele as the depression wore on. With her knowledge of books and library work, she impressed upon her well-to-do friends the advisability of culling their libraries and selling off the undesirable, trashy type of thing, preserving in their libraries the kind of books one would like to see there. She explained that she would make either linoleum or zinc bookplates, placing them in each volume for the owner to sign. The books that were undesirable were placed in rental libraries and others were sold, helping defray her fee, which was ten dollars for refurbishing the average home library.

Novel Advertising Stunt

A YOUNG man with originality conceived the idea of a brand new advertising medium. He rented a vacant store on a well-traveled street of his home city, then rented out space on the walls to customers who wished to advertise property or services for sale. This was done in the form of signs of uniform size, some 18 inches square. As the idea caught on, the proprietor acted as agent in bringing advertiser and customer together, securing a commission when a deal was completed.

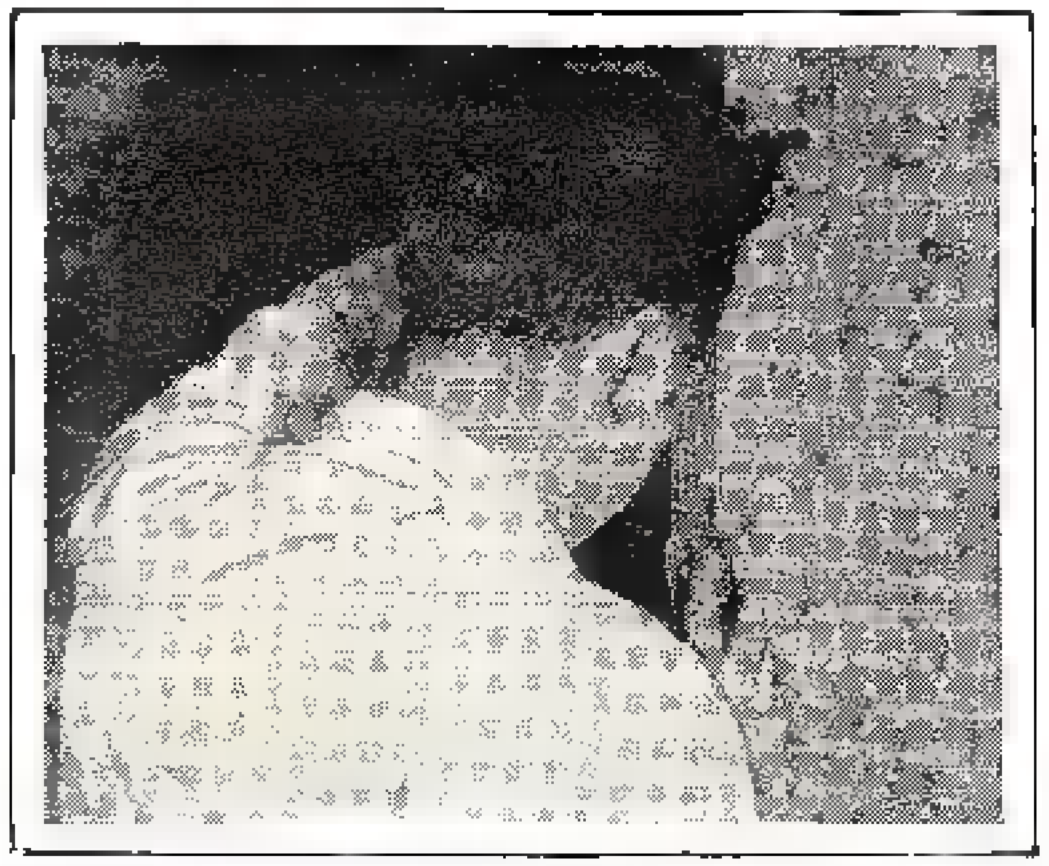
"Magicking" for Money

A CIVIL engineer whose firm shut down purchased two books on Magic and began to practice magician's tricks on his friends. He practiced until he had a number of tricks suitable for an hour's entertainment, when he began to charge for his act. Clubs, schools, luncheons and lodges he found good prospects for his services, and as his fame became known within his village, he found no difficulty obtaining bookings which bring him more money than the job he lost.

Door Repairs Bring Honest Dollars

IT IS rare that ■ house does not have at least one door that is giving trouble, either through sagging or warping. A little kit of tools thrown over the back and a call from house to house agreeing to repair such doors for one dollar apiece will develop business.

The repair kit does not need to go beyond ■ few screws, a driver, ■ plane, a hammer, etc. Sometimes the mere ■ of ■ plane, other times the replacing of ■ hinge, will solve the problem.



Most houses have sagging doors that annoy the occupants. A plane and ■ few tools make repairs at a dollar per door.

Grocers Welcome This

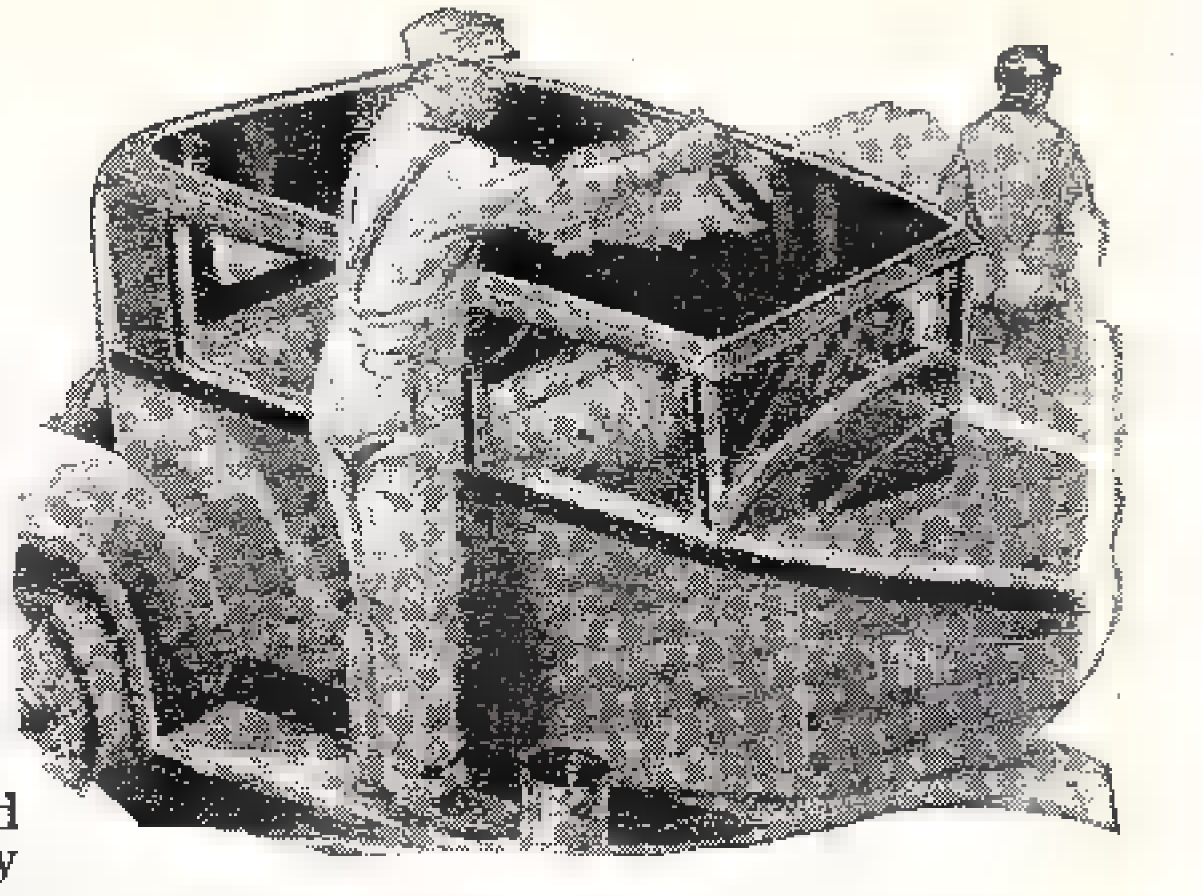
A MAN who had not been able to secure a job for some time hit upon this novel idea for making ■ living, and now would not have his old job back. He checked the telephone directory with city directory and listed the names of people without a telephone. He took this list to a prominent grocery store and the manager checked the list with his list of customers, finding, of course, that only a small number of these people were trading with him. My friend then got a job calling on these people daily soliciting business for the grocery store on a percentage basis. He got the surprise of his life at the amount of business received and the grovery store was equally surprised at the new customers on the list at the end of the month. He is now calling on his daily trade for his orders in the morning and, having increased the business at the store, is working evenings and rush days at extra pay.

Money in Piano Cleaning

IF a mechanic will examine a formula book at any library he will find a preparation that will turn piano keys back to the original white lustre. This can be made the basis of a little business, for the keys cannot only be whitened, but the mechanic can also clean and moth-proof a piano with little additional expense and get a round figure for the whole job. Each job should be done for about three dollars and it will be found that about a half day will be required to do a really fine piece of work. Dust should be brushed out with small brushes, moth-proofing liquid should be sprayed in with ■ small hand sprayer, and a film of light oil should be placed on the strings and over exposed metal points like the pegs to prevent further rust. When the housewife looks at her nice new and clean keys, she will be more than willing to pay the price. If she only wants the keys restored, that should cost her ■ dollar.

This stunt can be worked in cooperation with piano tuners who can put you next to live prospects for cleaning service.

Any formula book gives a recipe for ■ piano key cleaning fluid, costing very little, so that jobs are mostly profit.



Auto Top Refinishing

A PAINTER thrown out of employment now makes a good living refinishing auto tops. He stations himself near a parking lot, or any spot where cars stop for a few minutes, and offers to refinish dingy tops for 25c, 35c or a dollar, depending on the area to be covered. All he has to carry with him is ■ brush and ■ can of black top dressing. Psychology works in his favor because the average car driver won't take the trouble to drive into a paint shop to have his car top refinished, but will be glad to have the job done without troubling him while he goes on about his business.

For Radio Men

A YOUNG fellow trained in radio who lived in New York recently developed a phase of business that brought him many dollars and was never even dreamed of by his competitors. This young man canvassed the brokerage offices of the city and told them how nice it would be to have a public address system in each office so that special news bulletins received on the news tickers could be read off to all of the customers in the trading rooms. Within the space of a few months, this young man had made seven installations, one of them running into several thousand dollars. As a matter of fact, he made money much faster than he had ever made it repairing and selling radio receivers. Yet he did nothing that the average fellow interested n radio cannot do. Even in the smaller cities nowadays there often are as many as ten or fifteen brokers.

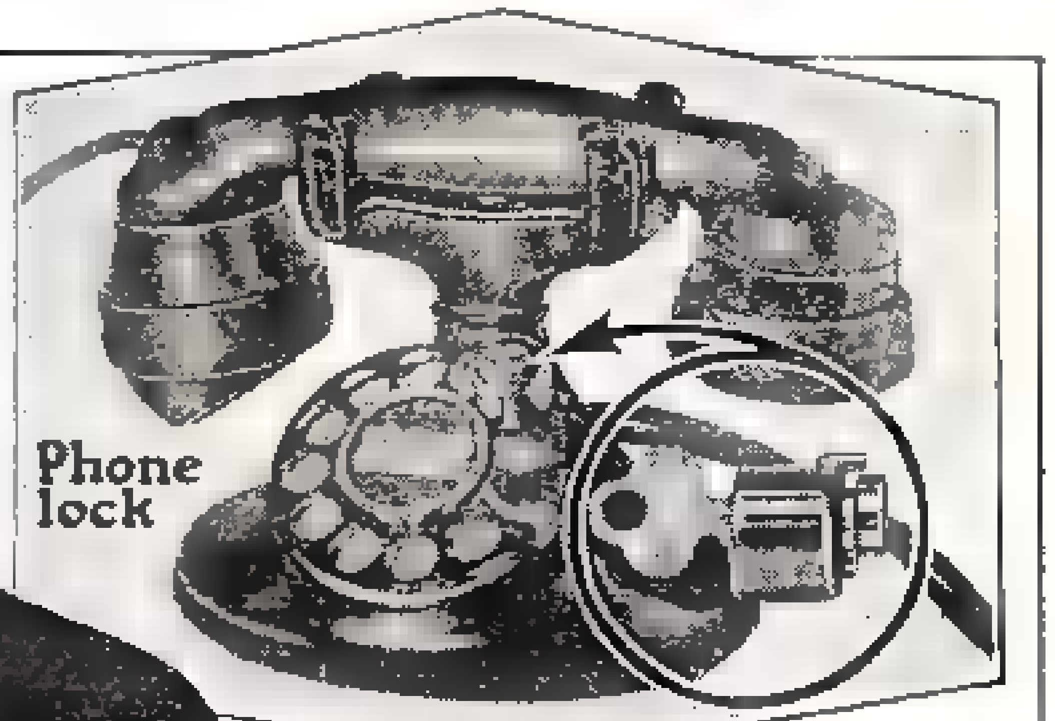
Coal Orders

A PROFITABLE, though seasonal, occupation, but one needing no investment, was devised by a former mill superintendent, out of a job. He capitalized on his wide acquaintance and long standing in the community to solicit coal orders on commission and a flashing neon sign in the window of his home informed the public that even though it was a residence "Coal Orders Are Taken Here." The idea can be applied to other commodities to eliminate the seasonal angle.

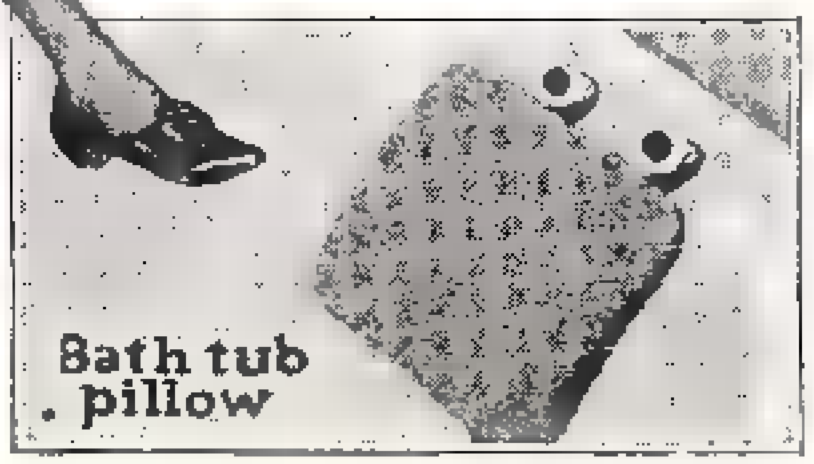
New INVENTIONS Remove LABOR from Housekeeping

Arm-chair radio

Radio tuning dials are at your finger tips as you sit in this new easy chair which has broadcast set built into arm.



Unauthorized phone calls cannot be made from phones equipped with the dial lock shown above. The lock does not interfere with incoming calls.



Rubber pillow attachable to bath tub with suction cups permits you to recline comfortably.

Baby cage

Babies who must live in apartments get plenty of sunlight and fresh air playing in this cage which attaches to window.

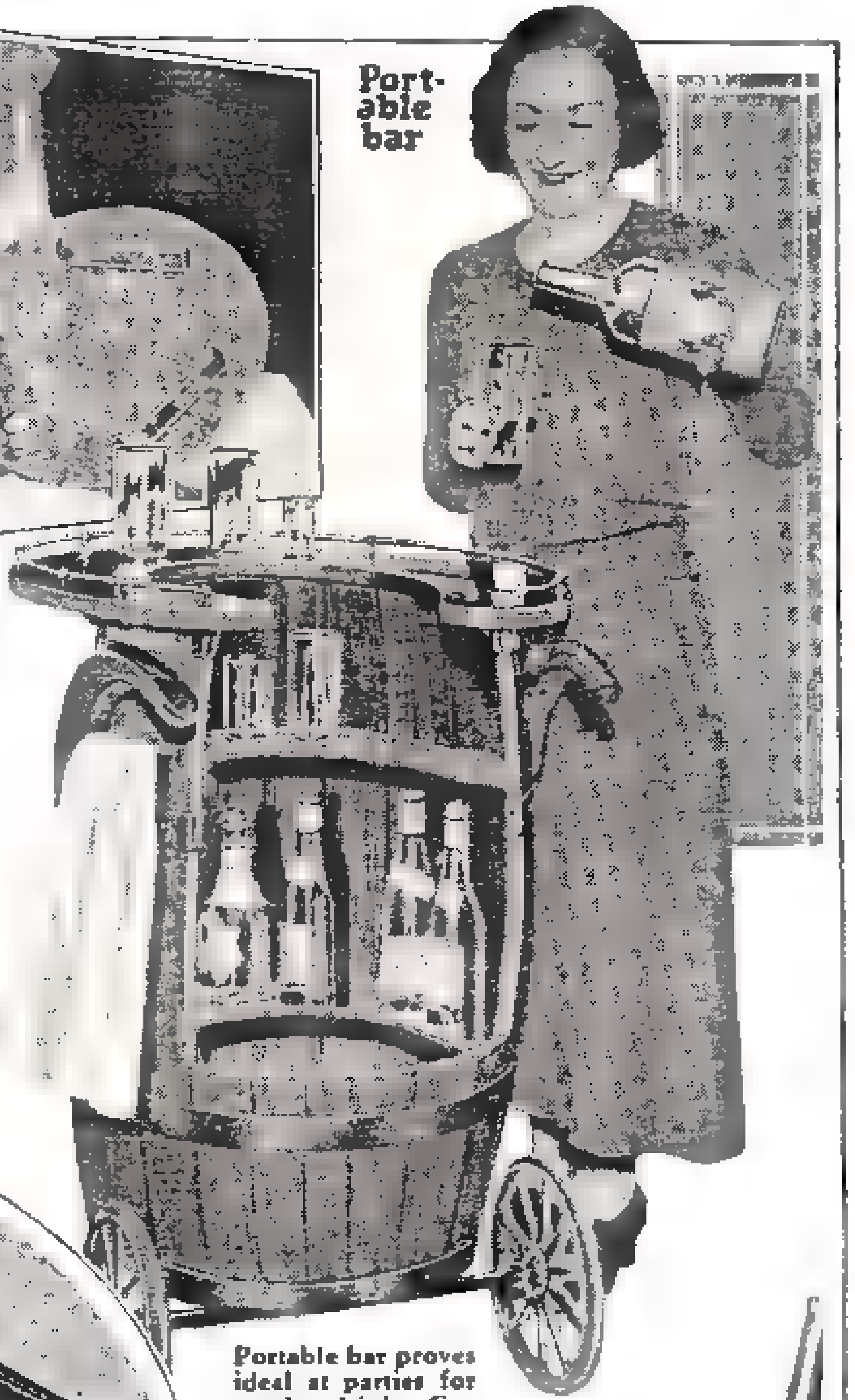
Furnace cleaner

New gas attachment which is lighted and burned but a few minutes and then removed makes furnace lighting clean, easy and quick procedure. Does away with kindling and saves coal.

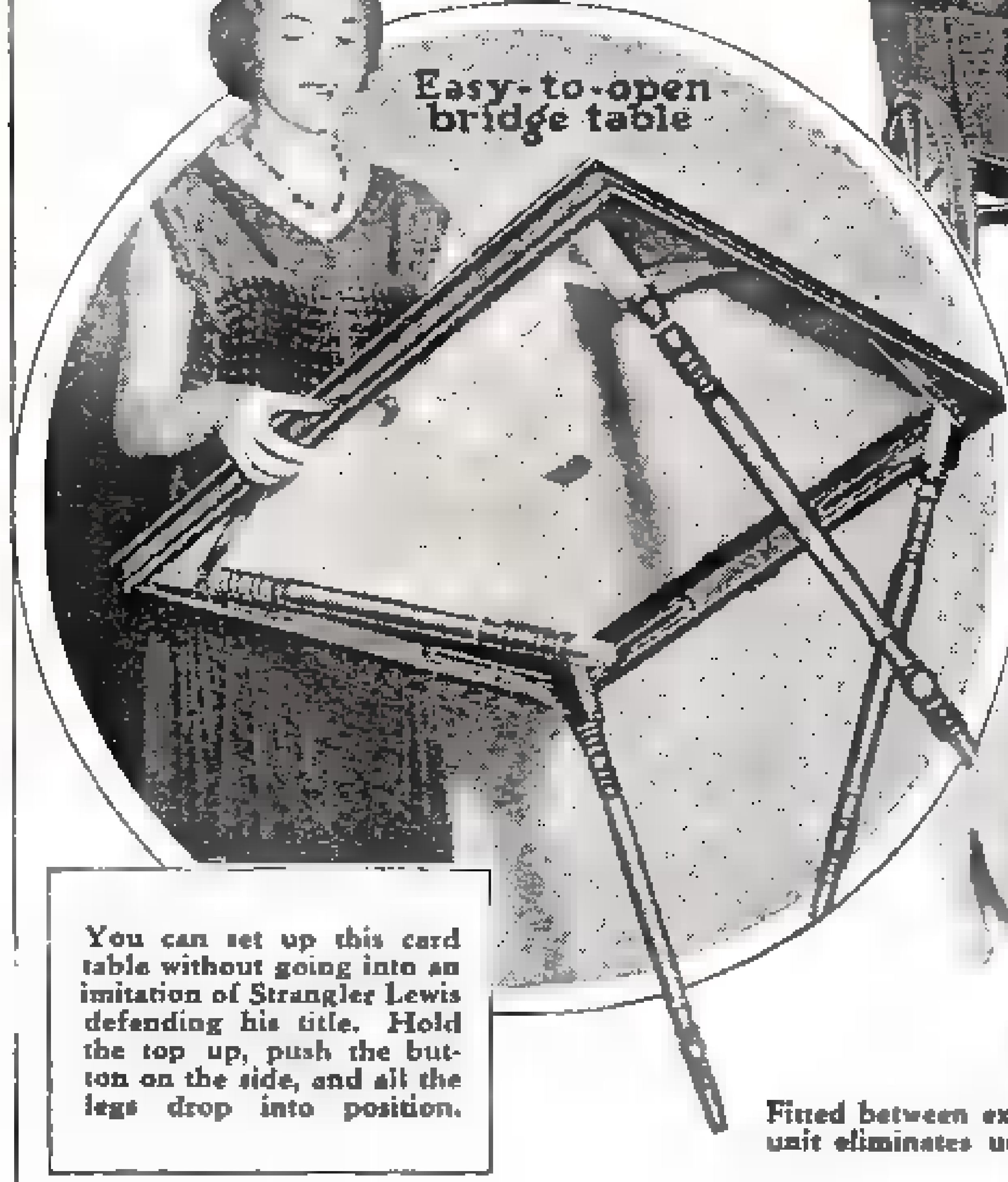
Removable pan-bottom

Paper bag refrigerator

New removable pan bottom, ideal for cooking vegetables, spaghetti, stews, etc., prevents the foods from sticking to the bottom and is easy to wash. Left—Triple-walled paper bag with an insulating substance packed between the walls maintains the temperature of an article contained within it at constant level for an hour or more. Ice cream will stay frozen, coffee will remain hot.



Portable bar proves ideal at parties for serving drinks. Can be easily moved any place with handles and wheels.



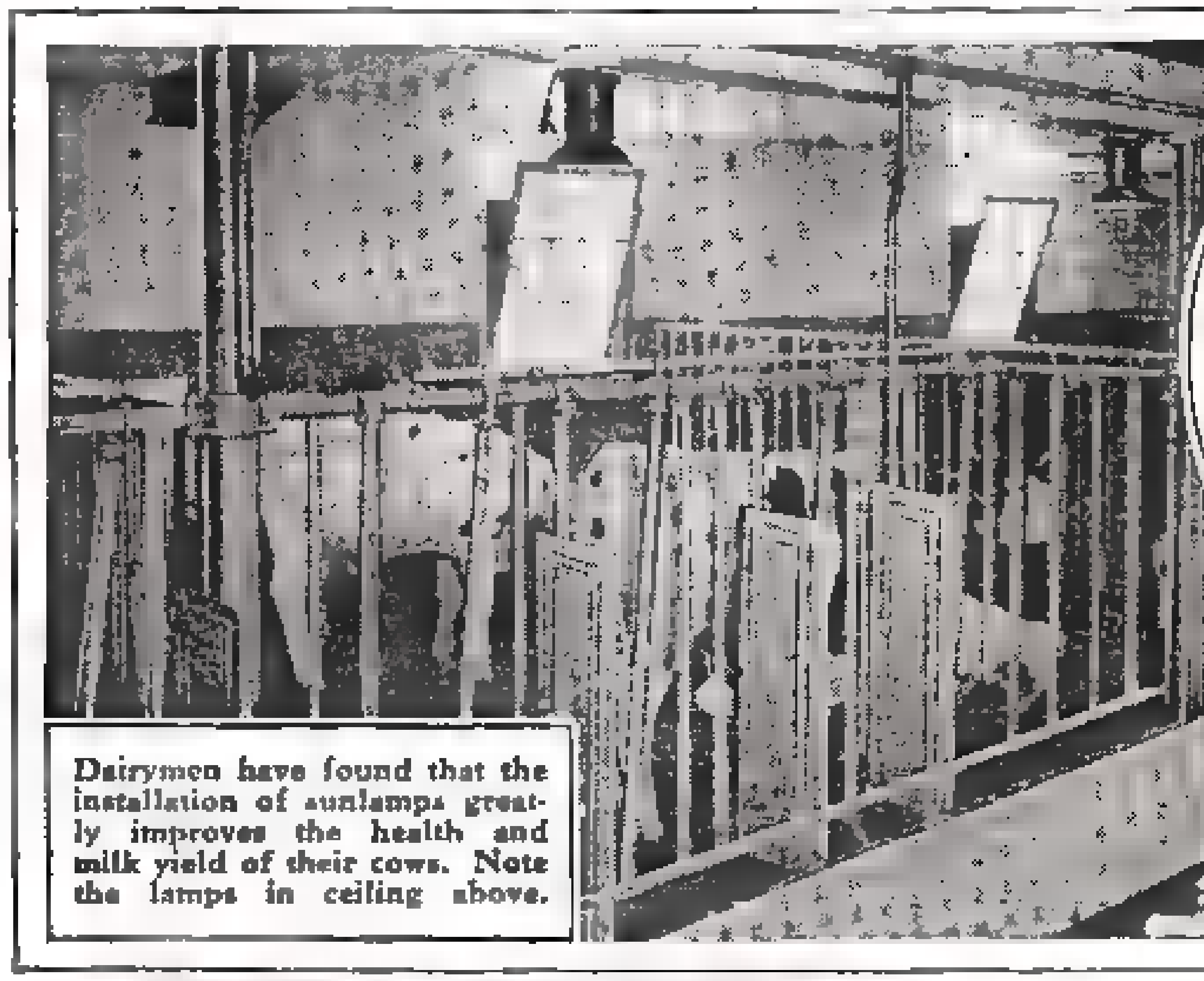
You can set up this card table without going into an imitation of Strangler Lewis defending his title. Hold the top up, push the button on the side, and all the legs drop into position.

Dust collector

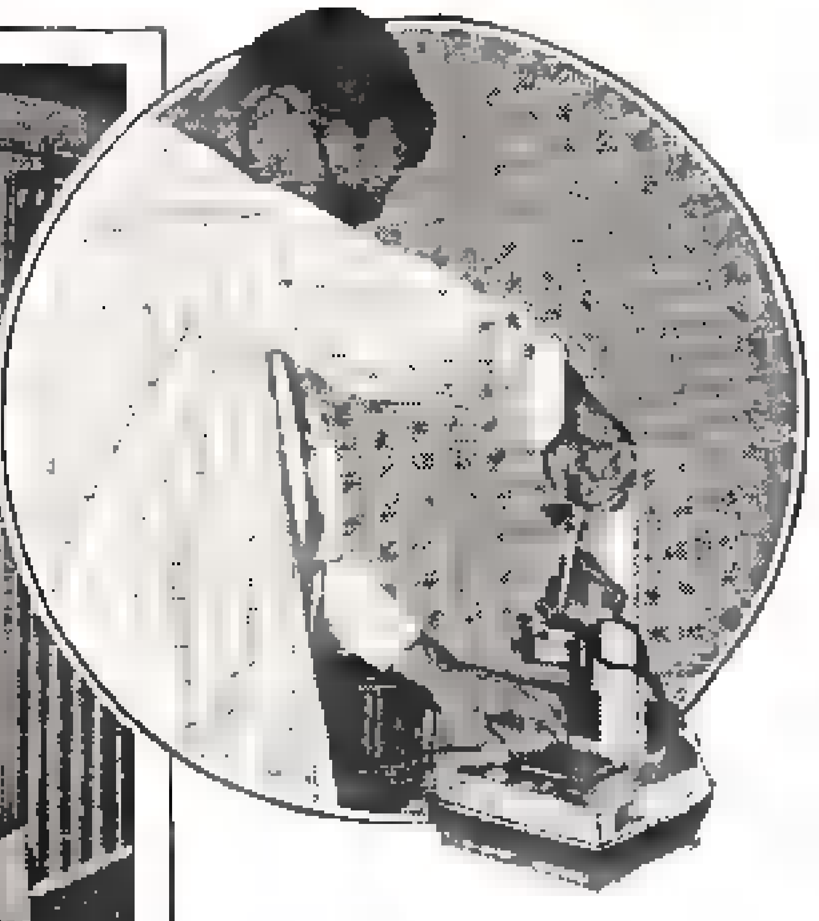
Fitted between exhaust of fan and bottom of bag, dust collecting unit eliminates unpleasant task of emptying vacuum cleaner bag.

LIGHT—Mystery Worker of Modern Science

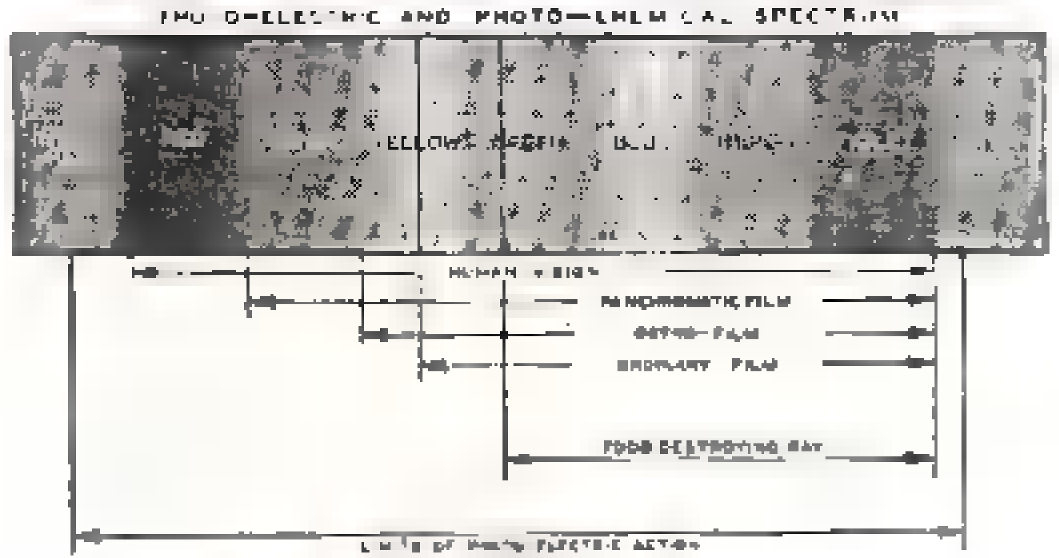
It affects what you see, what you eat, what you wear!

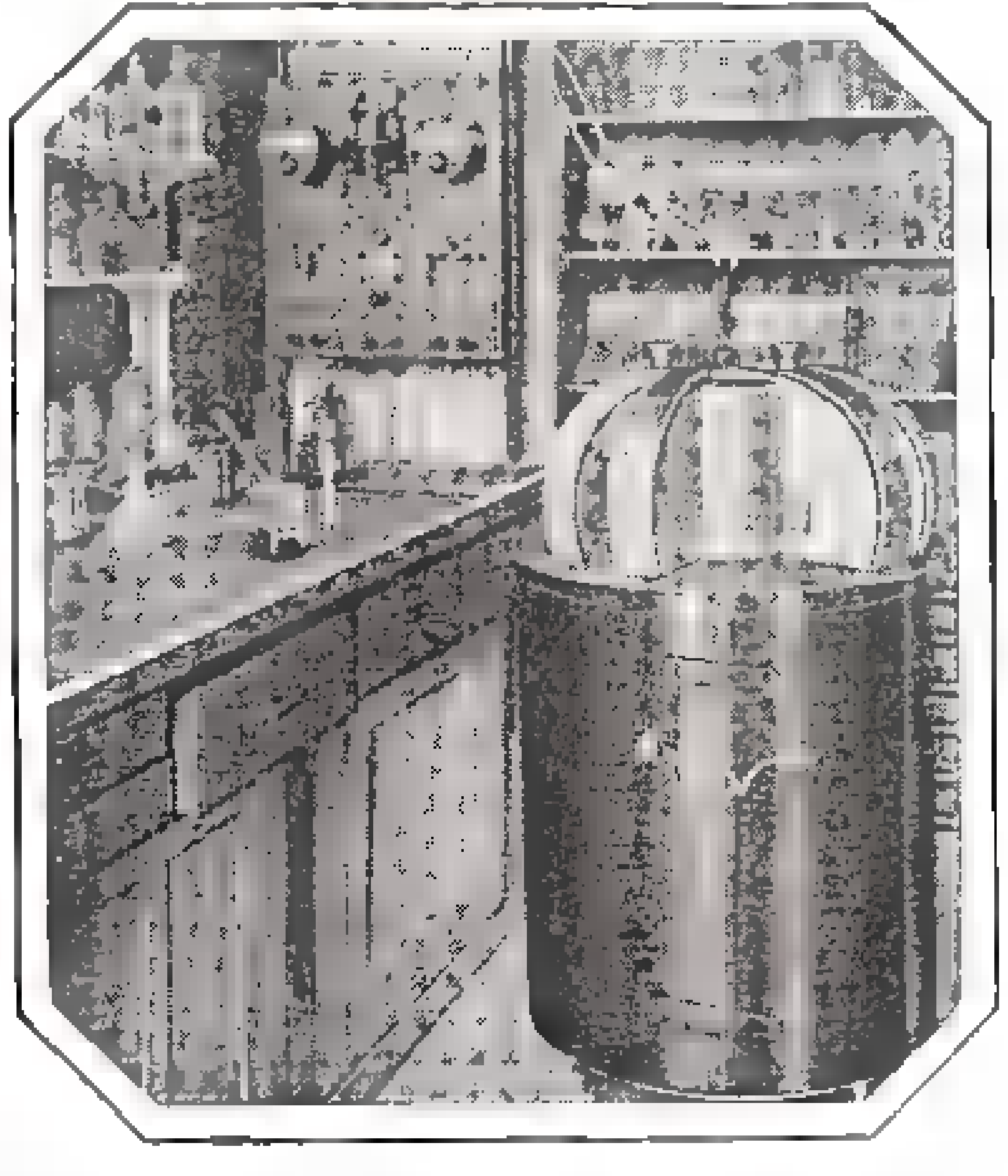


Dairymen have found that the installation of sunlamps greatly improves the health and milk yield of their cows. Note the lamps in ceiling above.



Scientists have found that light has a powerful chemical action on certain foods. Here a leaf of lettuce is being treated through a filter to determine effect of light.





Here is an X-ray diffraction apparatus that will record the crystal patterns of fifteen various substances and thus permit chemists to accurately determine their compositions. At top is spectrum chart showing effects of light on film.

IN 1887 a purring cat kicked over a dish containing an extract of nut-galls and chemists began to ponder on the weird and mysterious chemical action of light. That was back when Talbot was experimenting with some half-exposed papers covered with silver chloride. This making visible of the chemical effects of light was of far-reaching importance. It gave us photography, made us light conscious from a scientific viewpoint.

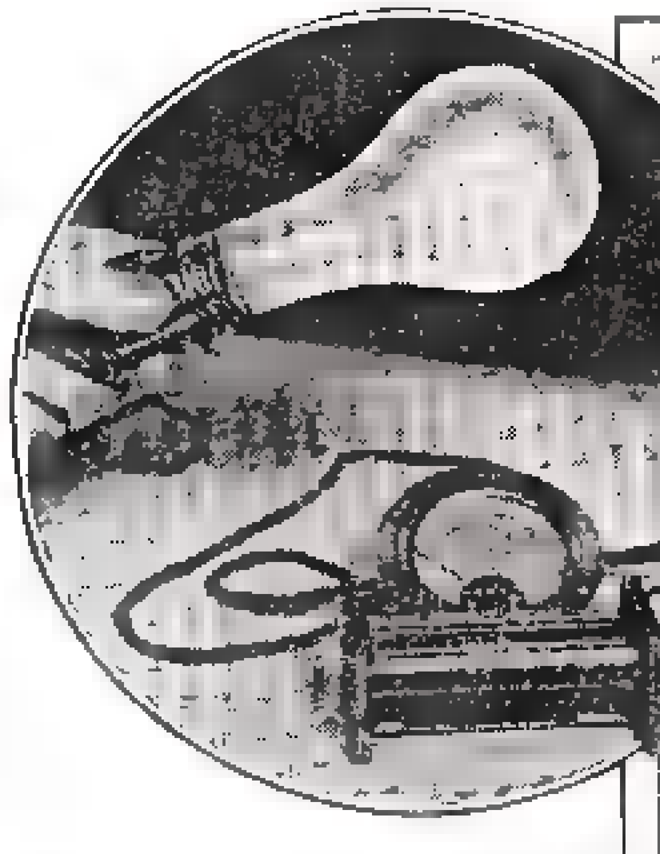
Our coal deposits, the formation of sugar in plants through the catalytic action of light in connection with chlorophyll, the fading of fabrics and paint, sunburn and photography are all commonly known to be the result of photo-chemical action.

Not so commonly known, however, is the fact that sunlight kills our auto tires, spoils certain food, breaks down certain oils and decomposes many of the chemicals and drugs that we buy at the drug store. Indeed our chemists are just waking up to the fact that countless millions of dollars worth of materials are destroyed this way annually.

The problem of thwarting this harmful effect of light is aggravated by the fact that certain wavelengths and not white light as a whole bring about the changes. That is to say that all of the colors of light are not equally effective in a single case.

In the action of light on silver chloride (photography) it has been the green and blue lights that have been most effective, while the reds and yellows have been, until very recently, the bad boys who refused to be finger-printed. On the other hand, where the action of light and chlorophyll is concerned in the generation of sugar for plants, it is red and yellow light that causes changes.

We may prove this by trying to raise a plant with a color filter that will not permit red and yellow to pass. The plant soon dies. Under these conditions, it will assimilate none of the carbon dioxide present in the air.



Light falling upon photo-sensitive surfaces generates electricity, showing close relation that light may bear to chemistry.

Many enterprising farmers in the country are using searchlights to supply artificial sunlight to hasten the growth of plants, as may be seen above. Plants that bloom only in spring or summer can be forced to bloom in the dead of winter. Left — Chemical manufacturers are now putting out many of their products in brown glass bottles to protect contents from light.

Ceiling-type sunlamps installed at swimming pool in the Hotel St. George, Brooklyn, to improve health of bathers.

Nowadays when we go to the drug store we notice that an increasingly large number of drug manufacturers are placing their products in colored glass bottles to preserve them. Brown of a certain very definite shade is being used a great deal, especially in preparations where it is desired to keep the gas chlorine associated in some sort of a weak union.

Chlorine is a sort of chemical turn-coat in its action with light. When it is mixed cold with hydrogen and placed away in a *dark* cold place, its combining power is too slow to be perceived. Light a ribbon of magnesium beside this innocent jar, however, and you will treat yourself to an explosion caused by nothing more tangible than the light you generated.

We have been considering the destructive ways of light. We must not remain unmindful of its many benefits; indeed its utter necessity. Light has been found to add something vital to foods. It was found some time ago that a certain brand of high-powered cathode rays, a sort of violent form of light, had the power to impart to breakfast foods some element that prevents rickets in the children who eat the foods.

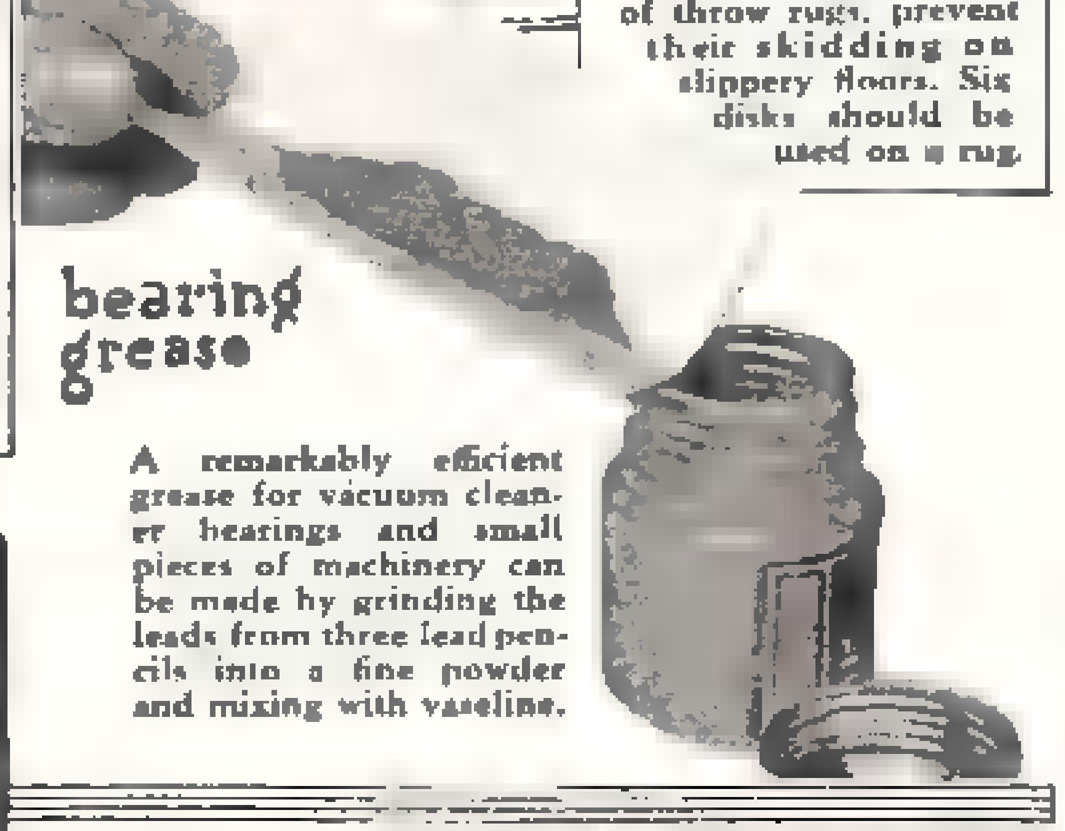
Today we have a number of foods prepared in the glare of certain kind of light. Even cigarettes have been treated with light in a process that is supposed to reduce irritating ingredients. Then we have many irradiated preparations that may be bought at the corner drug store.

FIX-UP STUNTS FOR THE HOME

cure for
sticking
windows

To cure sticking windows, melt some ordinary paraffin and apply to the window frames when liquid with a small brush. Do this during dry weather. The next time a damp spell comes along, the wood will be unable to swell and stick, since the paraffin prevents moisture entering the fibers, and also acts as a lubricant.

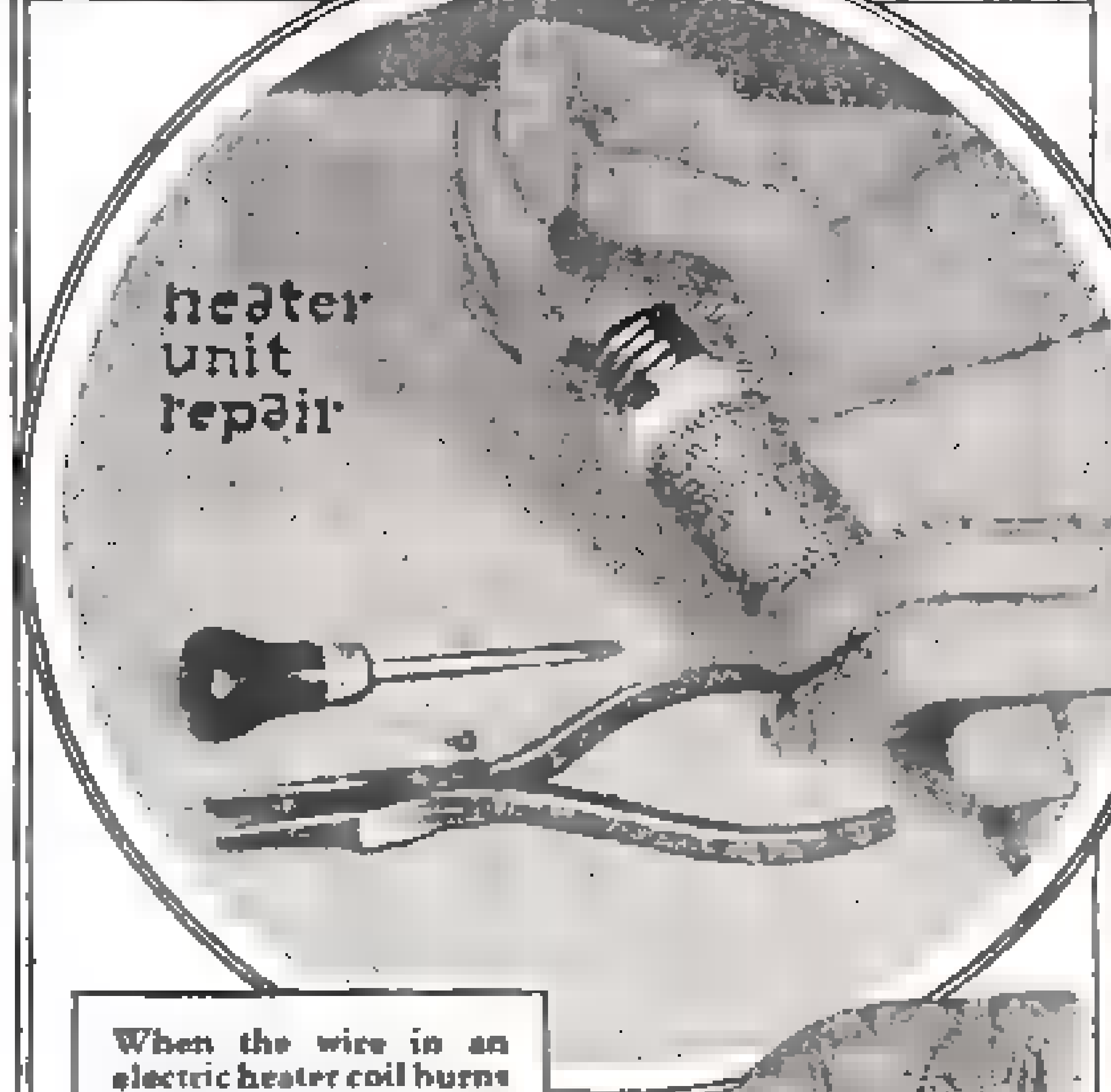
Disks about two inches in diameter, cut from coarse sandpaper and glued to the underside of throw rugs, prevent their skidding on slippery floors. Six disks should be used on a rug.



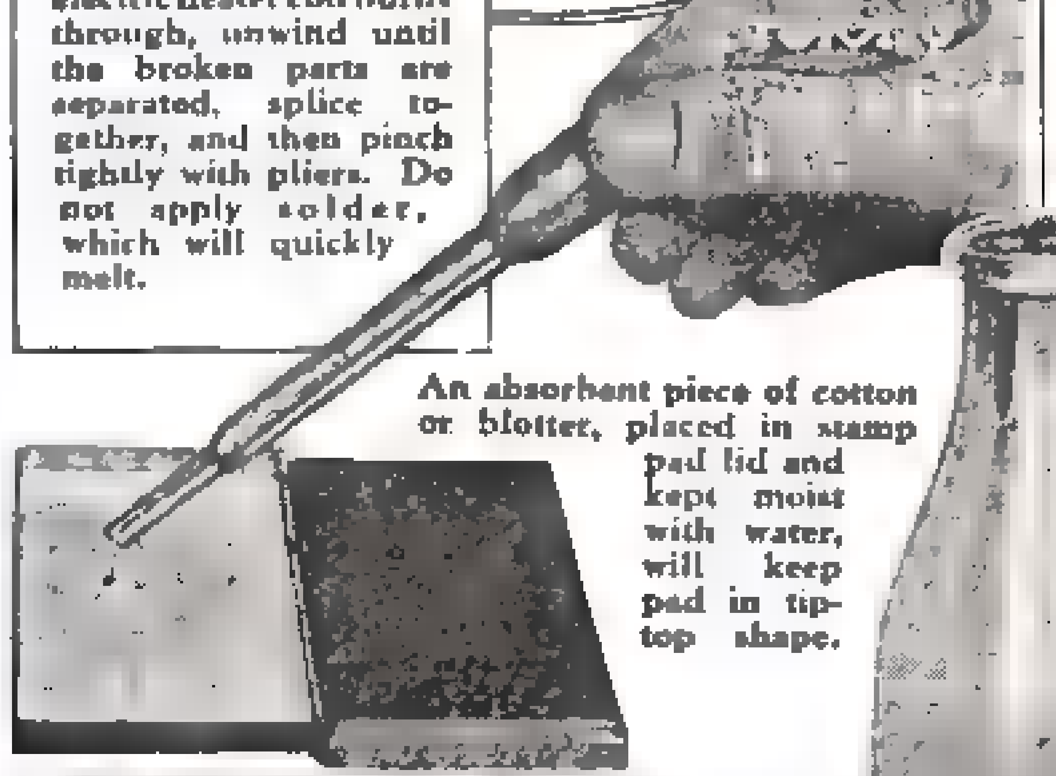
A remarkably efficient grease for vacuum cleaner bearings and small pieces of machinery can be made by grinding the leads from three lead pencils into a fine powder and mixing with vaseline.

Electric irons without automatic heat regulators can be controlled very simply. Place the iron on the bottom of a pan, as shown above. Surplus heat radiates away from the pan's surface. By using just the right sized pan (determined by experiment) the heat control is practically automatic.

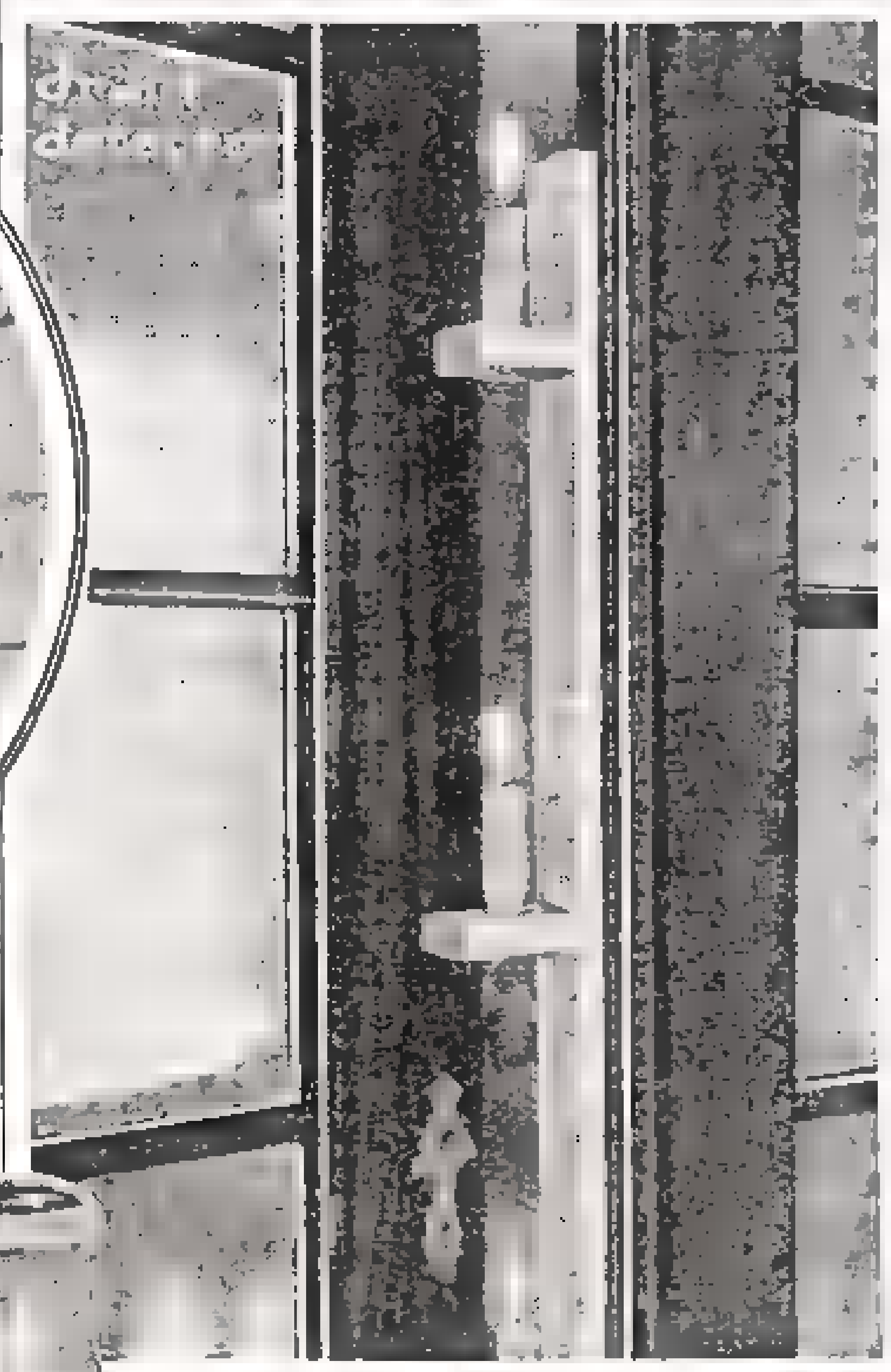
Plugs used in baseboard connections become spread a trifle with use, making poor connections with the circuit and causing flickering lights. A permanent cure can be effected by placing a bit of solder on the lugs to increase their thickness to a point where they will form a nice tight fit. A temporary remedy is to spring the lugs together with the fingers.



When the wire in an electric heater coil burns through, unwind until the broken parts are separated, splice together, and then pinch tightly with pliers. Do not apply solder, which will quickly melt.



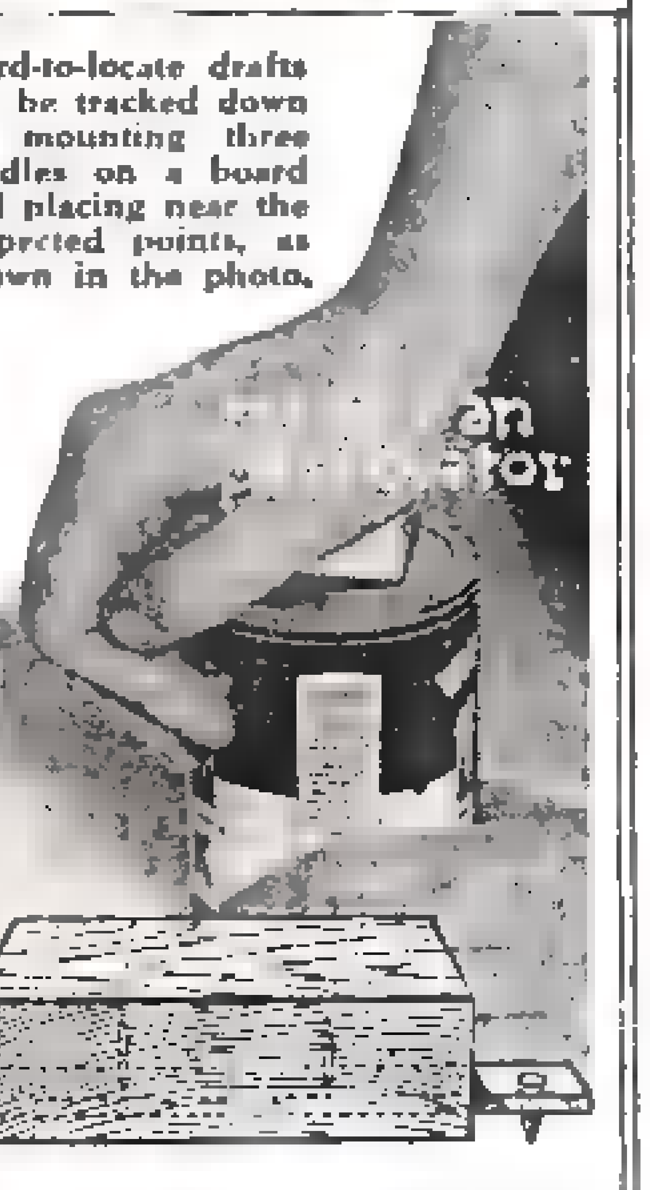
An absorbent piece of cotton or blotter, placed in stamp pad lid and kept moist with water, will keep pad in tip-top shape.



Hard-to-locate drafts can be tracked down by mounting three candles on a board and placing near the suspected points, as shown in the photo.

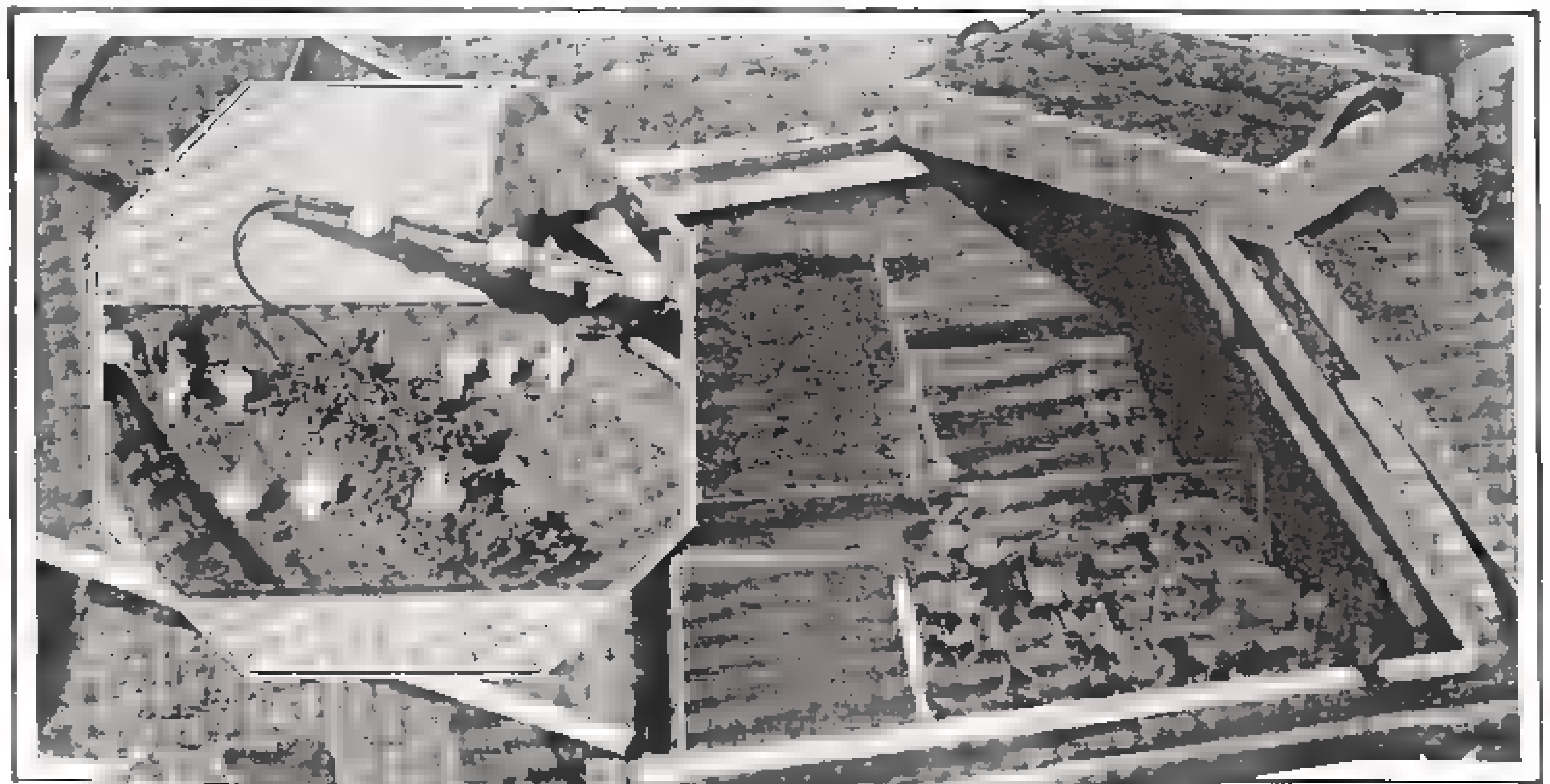
silverw
cleaned
sour milk

A purely chemical method of cleaning silverware, which removes none of the silver as is the case with polishes, is to immerse the silverware in a container of sour milk for 30 minutes to an hour. Lactic acid in the milk removes the stains when the silver is taken out and washed in warm water. Origin of the remedy is attributed to Paul Revere.

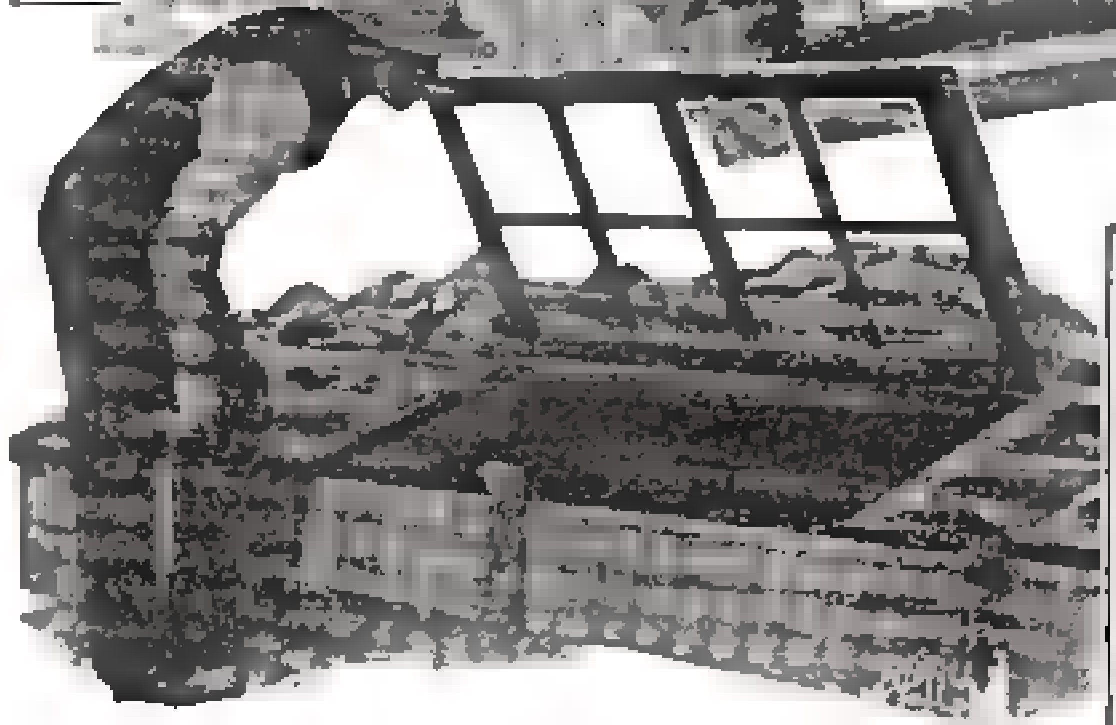


Condensed milk pours evenly out of a can only when two holes are punched—one for the flow, the other to admit air. A handy punch as shown above, made from scraps found in your workshop, speeds up the process and prevents painful and dangerous injury from slipping can openers.

Electric HOTBED Speeds Plant Growth



Another type of hotbed, sunk below ground, is shown above. Insert at left shows open loop of bare alloy used to transmit current instead of lamp bulbs.

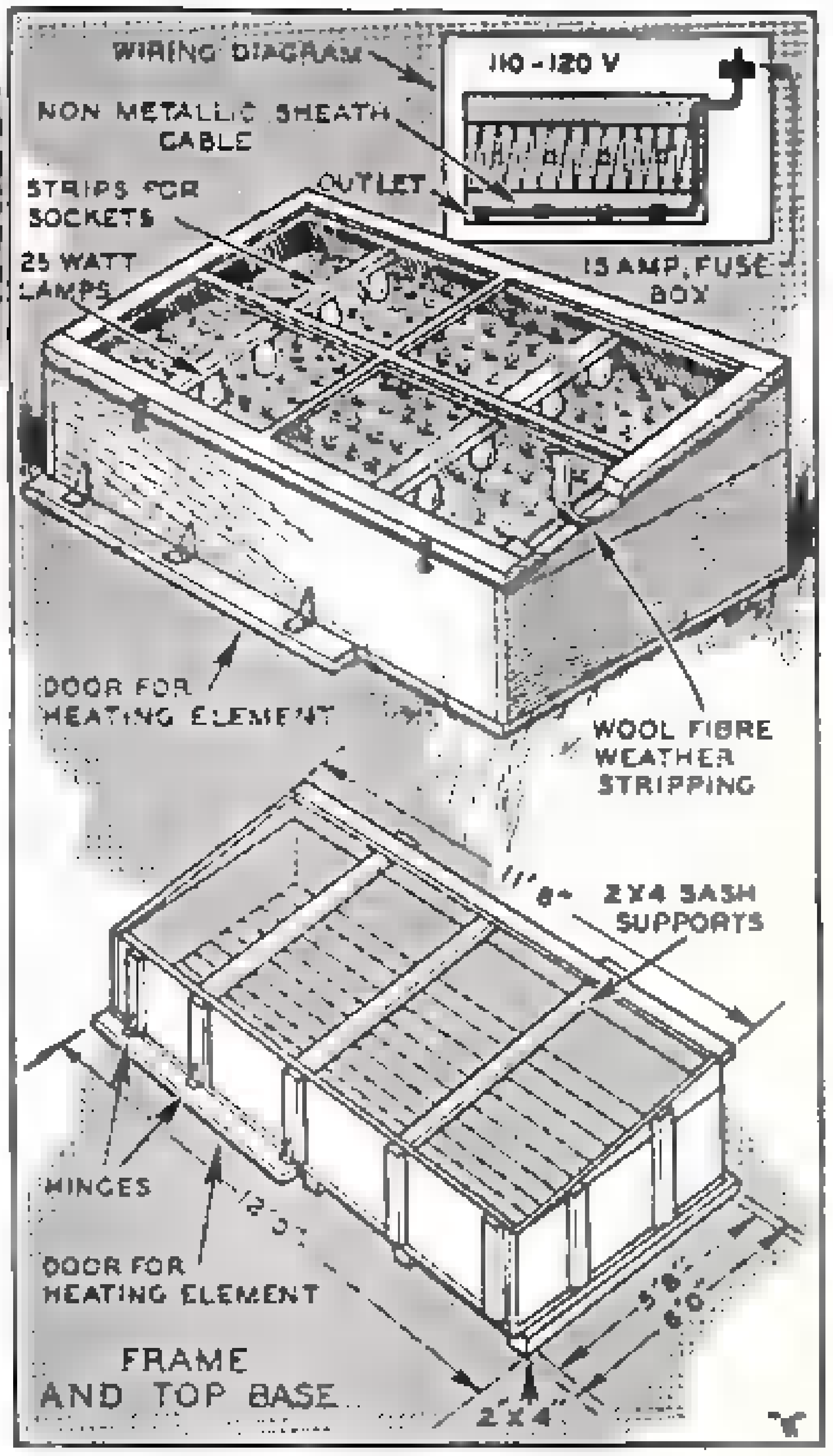


The gardener above is lifting the top of a four-section hotbed, heated electrically with lamp bulbs. Construction is simple, following principles described below, which may be altered to individual preference as regards dimensions.

BACKYARD gardeners who use an electrically heated hotbed can speed up plant growth amazingly. Lettuce breaks the soil in three days, geraniums root in half the time, and cabbages are ready for transplanting nine days from seeding.

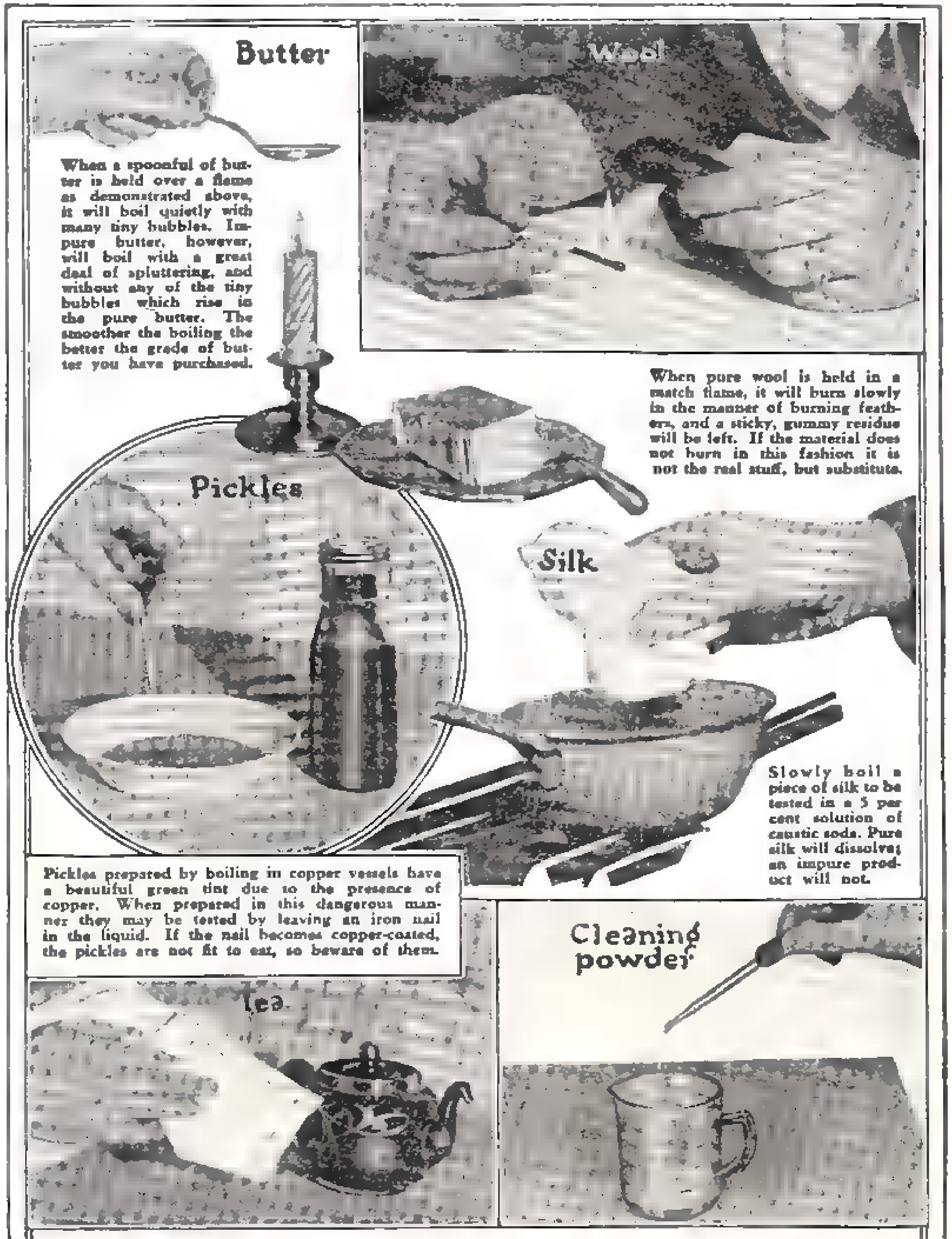
A small hotbed using eight 25-watt electric lamps can be built in half a day for less than $5. A 4x6 foot hotbed, built on the south side of a building, provides ample space for 100 seeds of 50 different varieties. Box construction is simple, the top being a frame to hold glass panes, with two cross strips, each of which carries four 25-watt bulbs spaced evenly apart, connected to an electric outlet from the building. A thermostat, obtainable at any electric supply house, automatically turns on the circuit when temperatures within the box fall below 50 degrees.

Two layers of translucent screen are advised for the top of the box. Air space between the two serves to conserve heat. Wool fiber strips afford a weather-tight seal between the box and the top of the frame.



Two suggested sizes of hotbeds are shown in drawing.

Testing HOUSEHOLD Materials



When a spoonful of butter is held over a flame as demonstrated above, it will boil quietly with many tiny bubbles. Impure butter, however, will boil with a great deal of spluttering, and without any of the tiny bubbles which rise in the pure butter. The smoother the boiling the better the grade of butter you have purchased.

When pure wool is held in a match flame, it will burn slowly in the manner of burning feathers, and a sticky, gummy residue will be left. If the material does not burn in this fashion it is not the real stuff, but substitute.

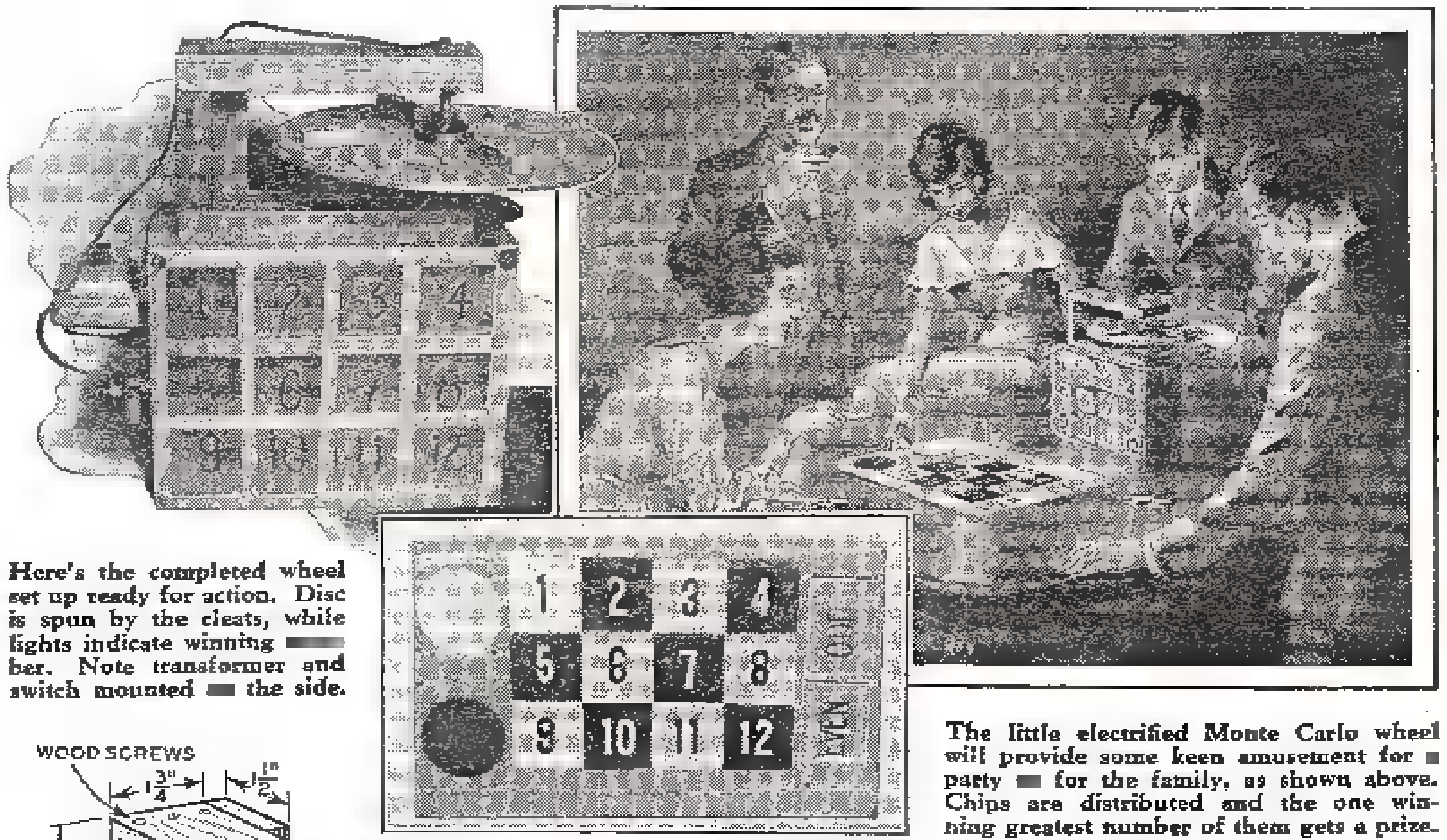
Slowly boil a piece of silk to be tested in a 5 per cent solution of caustic soda. Pure silk will dissolve; an impure product will not.

Pickles prepared by boiling in copper vessels have a beautiful green tint due to the presence of copper. When prepared in this dangerous manner they may be tested by leaving an iron nail in the liquid. If the nail becomes copper-coated, the pickles are not fit to eat, so beware of them.

Sometimes in low-priced teas dyes are used to impart a color above a natural tint. If some of the fresh tea is rubbed vigorously between the folds of a white piece of cloth, as illustrated above, some of the dye will be rubbed off. High grade tea shows no such stains.

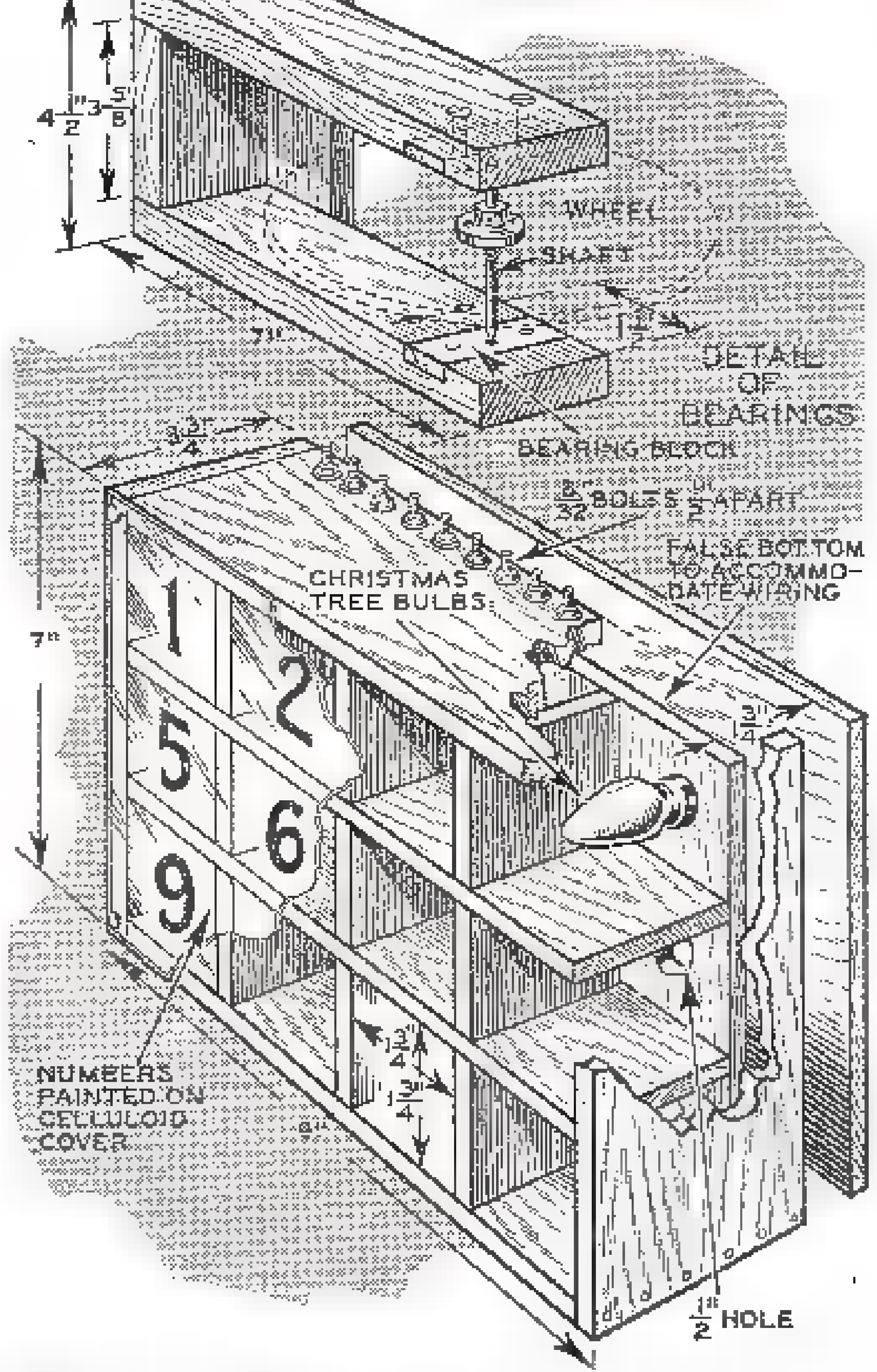
Presence of marble dust, which is a harmful abrasive, in cleaning powder may be detected by dropping a few drops of storage battery electrolyte on the powder. If a gas is liberated upon contact of the liquid with the powder, marble dust is present.

Have PARTY FUN With ELECTRIC Game of CHANCE


1
2
3
4
5
6
7
8
9
10
11
12
ODD
EVEN

Here's the completed wheel set up ready for action. Disc is spun by the cleats, while lights indicate winning number. Note transformer and switch mounted on the side.

The little electrified Monte Carlo wheel will provide some keen amusement for a party or for the family, as shown above. Chips are distributed and the one winning greatest number of them gets a prize.


WOOD SCREWS
1 3/4"
1/2"
4 1/2"
3 5/8"
WHEEL
SHAFT
7"
1 1/2"
DETAIL OF BEARINGS
BEARING BLOCK
3 3/4"
5/32" HOLES 5/8" APART
CHRISTMAS TREE BULBS
FALSE BOTTOM TO ACCOMMODATE WIRING
7"
1
2
5
6
9
1 3/4"
1 3/4"
NUMBERS PAINTED ON CELLULOID COVER
8"
1/2" HOLE

Details of box assembly are seen above. The arms which hold bearings for the spinning wheel are mounted on the top of box. Bearings should fit perfectly for long turns. At extreme top is layout of the playing board. Players can lay money on odd or even, on single numbers, or on 2 or 4 numbers. Croupier pays 12 to 1 on single number plays.

THIS is a miniature and electric version of Monte Carlo which has proven to be the life of many parties. When spun around it comes to a stop and flashes the winning number or the winning color through the medium of twelve Christmas tree lamps operating from an 8-volt door bell transformer or a battery of dry cells.

Work is started on the box and this is made of half inch soft pine or plywood, which is assembled with nails. There is a false bottom of white pine which is provided with twelve half-inch holes into which the little light sockets fit very tightly. The sockets are forced into place before the bottom is finally nailed in place with brads.

It will be found that these Christmas tree sockets have five-inch pigtails which are sufficiently long to make the needed connections to the brass machine screw terminals arranged in the back (see accompanying drawing). Thirteen screws will be needed, one for each one of the lights and one for a common terminal. Each screw is provided with a soldering lug. In making the common terminal, the twelve pigtails are all twisted together and then soldered, a lead being then soldered to the group and carried to the thirteenth terminal.

The wheel is cut from plywood to prevent future warping and it is provided with a steel or brass hub to anchor the wheel and to assure smooth, "wobble-less" running. The shaft is a quarter-inch brass or steel rod, the ends tapering 45° to a point.

The bearings were made of two small pieces of brass and provided with tapered holes that would fit the points on the ends of the shaft. The builder will do well to use a little care on these bearings, not only in drilling the holes but in lining them up as well. Good bearings prolong the spin and excitement.

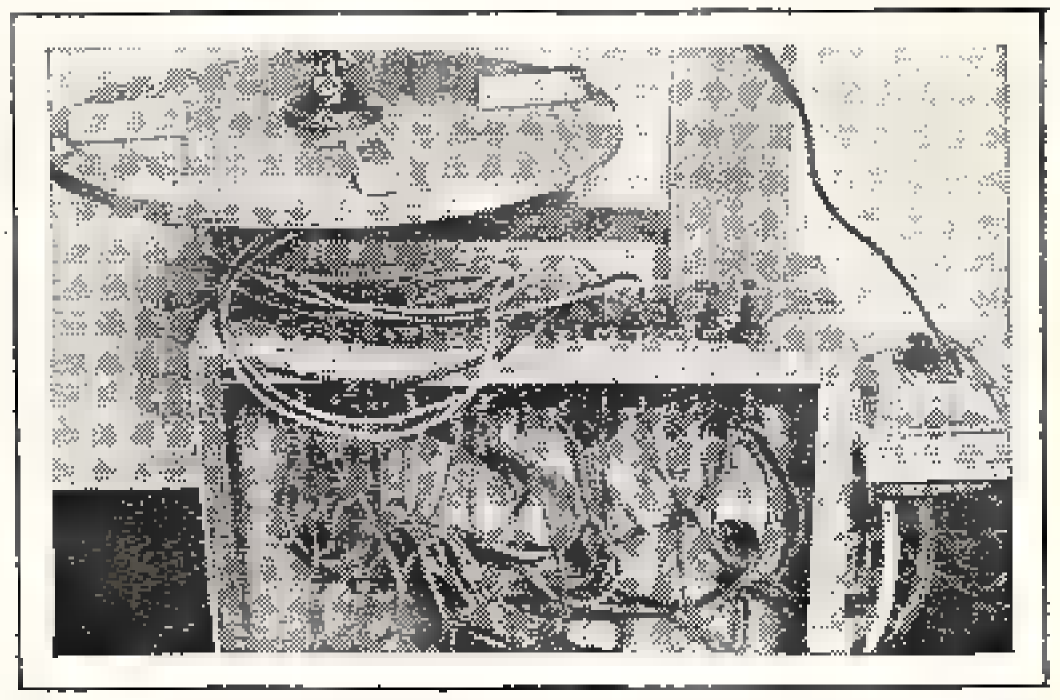
To facilitate spinning by the banker, the wheel is provided with four little cleats which may be glued on equidistant from the center to preserve the wheel's balance.

It will be noticed that under the head of one of the bearings holding the wheel a little phosphor bronze contactor strip is anchored at such an angle that its tip will play over the contacts point mounted under it. The mounting of the contact block, which is made of soft pine, is also important and it should be noted that this member does not bind the shaft.

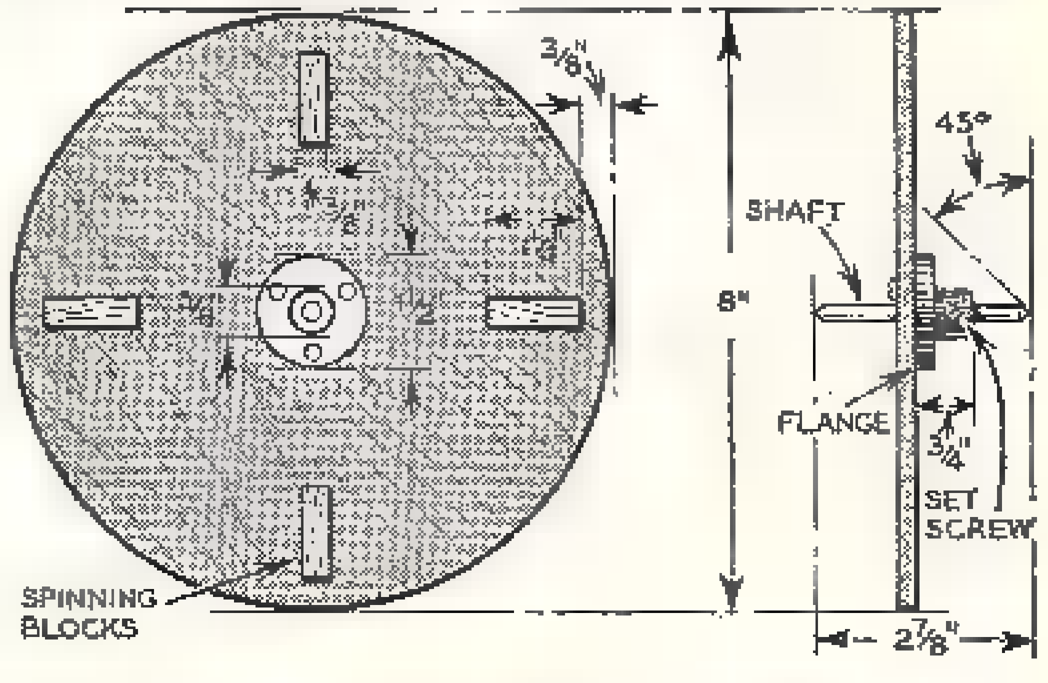
Now for the screen covering the lights. Six red lights and six greens are used and the numbers flash consecutively. Sheet celluloid was used and sand papered to diffuse the light. Take India ink for printing figures.

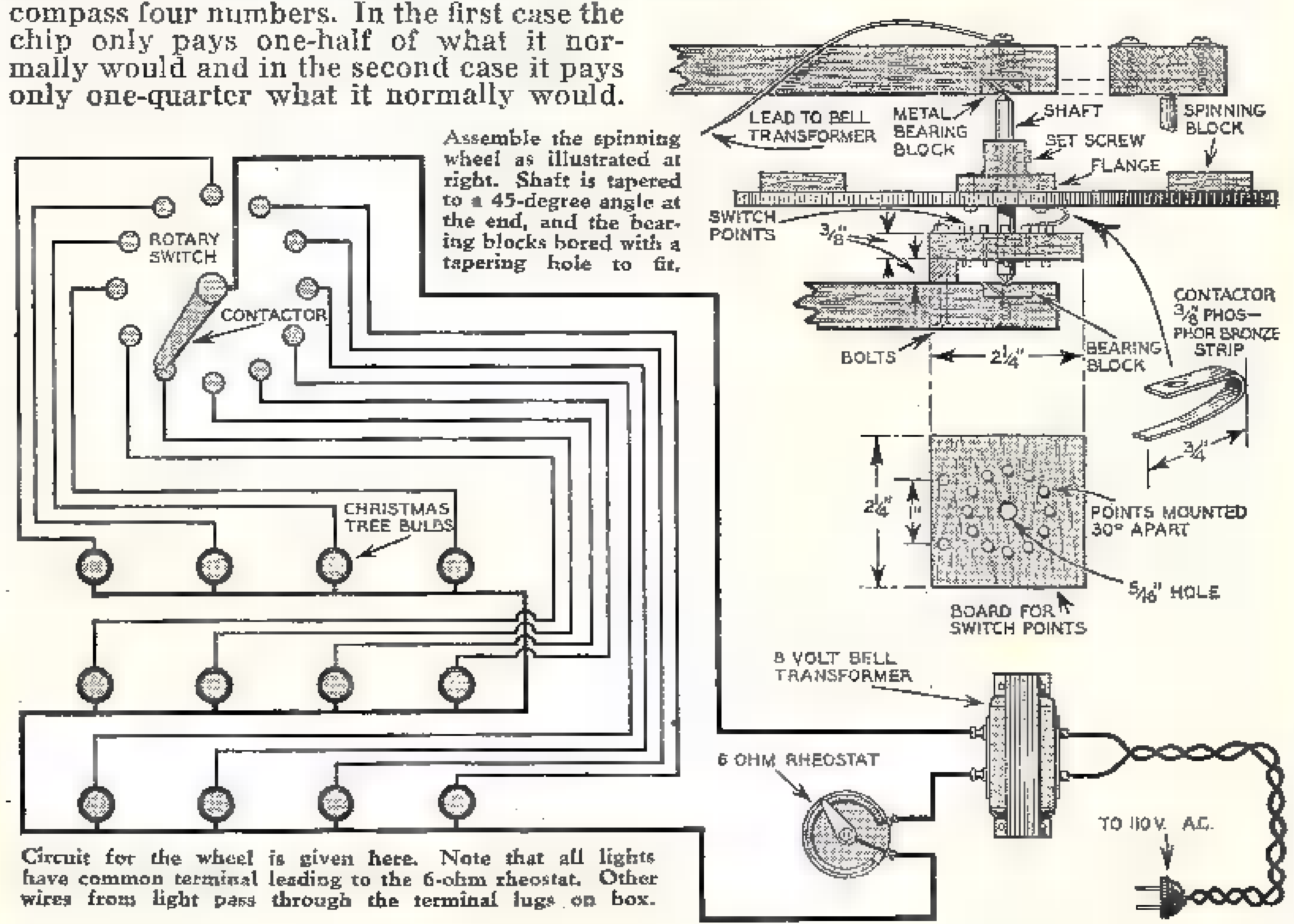
The board upon which all of the wagers are placed is cut from plywood and the squares painted to conform to the arrangement of the lights.

Now about the rules of the game. A player may bet odd or even, green or red, individual numbers, two numbers or four numbers. When two numbers are played the chip is laid half on one square and half on an adjacent square. If four numbers are to be played the chip is placed so as to encompass four numbers. In the first case the chip only pays one-half of what it normally would and in the second case it pays only one-quarter what it normally would.



Rear view of the box here shows how the lights are wired to the terminal bolts at the top. One wire from each light leads to a bolt, while remaining wires go to 13th bolt. Note cleats on the wheel. These are grasped preparatory to giving a vigorous spin—and the stronger the better.


3/8"
SHAFT
8"
45°
FLANGE
3/4"
SET SCREW
2 7/8"
SPINNING BLOCKS


LEAD TO BELL TRANSFORMER
METAL BEARING BLOCK
SHAFT
SET SCREW
SPINNING BLOCK
FLANGE
SWITCH POINTS
3/8"
BOLTS
2 1/4"
BEARING BLOCK
CONTACTOR 3/8" PHOSPHOR BRONZE STRIP
3/4"
2 1/4"
1"
POINTS MOUNTED 30° APART
5/16" HOLE
BOARD FOR SWITCH POINTS
ROTARY SWITCH
CONTACTOR
CHRISTMAS TREE BULBS
8 VOLT BELL TRANSFORMER
6 OHM RHEOSTAT
TO 110V. A.C.

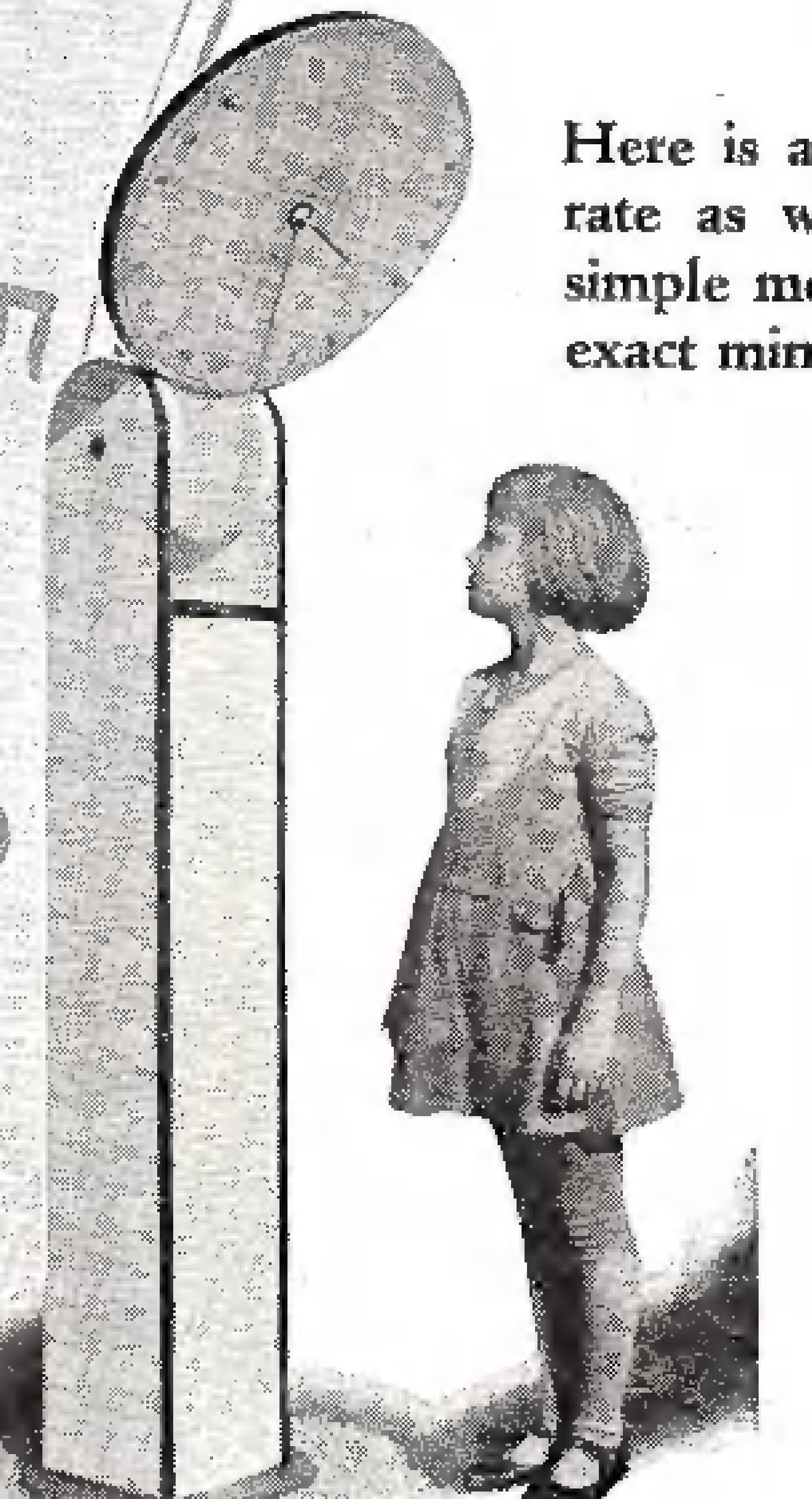
Assemble the spinning wheel as illustrated at right. Shaft is tapered to a 45-degree angle at the end, and the bearing blocks bored with a tapering hole to fit.

Circuit for the wheel is given here. Note that all lights have common terminal leading to the 6-ohm rheostat. Other wires from light pass through the terminal lugs on box.

A SUN DIAL that's DIFFERENT

by PAUL R. RANNIE

Here is a universal sundial that's extremely accurate as well as highly ornamental. With a few simple mechanical adjustments, it tells time to the exact minute and date both in winter and summer.



A general view of the sundial. The time is about 1:10 p.m. The lower side of the dial is read in winter, as above.

IN ADDITION to showing the time of day within a minute or less of the actual time, this sundial has other interesting features. Namely, it indicates the approximate date during a greater part of the year. And it can be used in all seasons because the lower side, which is protected from the ice and snow, is read in the winter.

The sundial as here shown may be termed a universal dial because it can be used any place on earth, the only adjustment required being the angle of the dial surface.

Has Adjustments to Correct Time

The sundial is always accurate because it has an adjustment which corrects for what is called the "Equation of Time." The "Equation of Time" is the difference in time between "mean solar time" (which our clocks indicate) and "apparent solar time" (which the sundial indicates). Ordinary dials are at certain times as much as 16 minutes off.

The accompanying drawings and photographs show the principal features of construction. The foundation upon which the sundial is mounted is simply a platform of rough boards about 20" square and fastened securely at each corner to a 2x4 stake. Be sure that it is perfectly level. Make the hole in the ground larger than the platform and fill below and around the edges with gravel as illustrated in Fig. 6. Use screws to fasten the platform to the stakes and throughout the sundial if possible.

The circular base, which is made of two layers of 1" boards nailed together, is mounted so it may be rotated on the square platform. It is clamped in position by four wooden blocks which grip its beveled edge. A large nail or screw may be placed in the center of the base to aid in making it rotate freely.

Two square blocks the size of the inside of the square column are nailed to the center of the circular base. The square column slips over these blocks and is fastened with screws.

Dial Is on Duty in All Weather

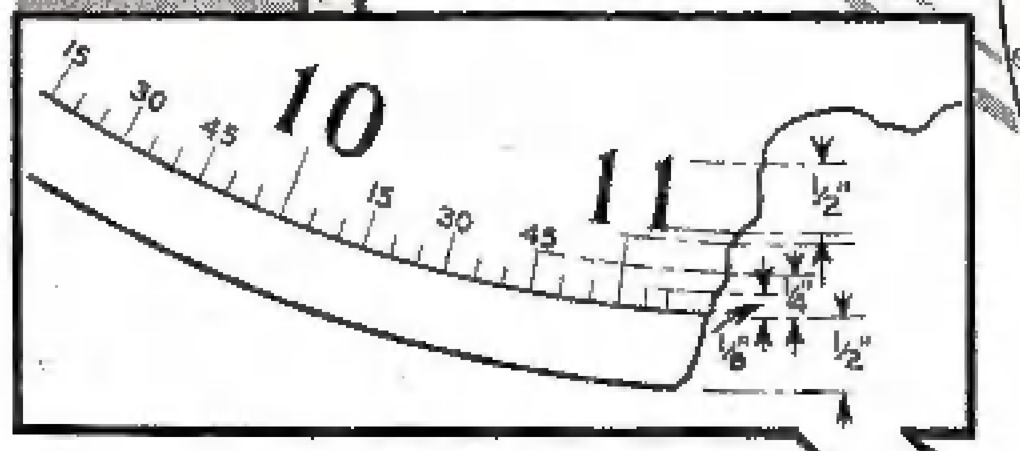
The square column and also all the other parts of the sundial should be made of well seasoned material and the boards painted on all sides before assembling to insure against warping. (See Fig. 6.)

The support for the dial proper is made from a 12" board. A 3" hole, which is the bearing for shifting the dial, is cut in the center near one end and the 7½" arcs, as shown on the drawing, are cut in order that it may fit inside the dial rim. The other end is cut down to 5" and the two 8" circular side pieces are mounted as shown.

These 8" circular pieces are clamped tightly between the rounded ends of the extended sides of the square column by means of two 2¾" wood screws. These wood screws also act as bearings.

The dial surfaces are made, preferably, of "press-wood" although plywood will suffice. The dials are held together at the center by a circular piece of wood, approxi-

Further north dial is stationed, the lower it is tipped. Here is the North pole adjustment.


15
30
45
10
15
30
45
11
½"
¼"
⅛"
½"

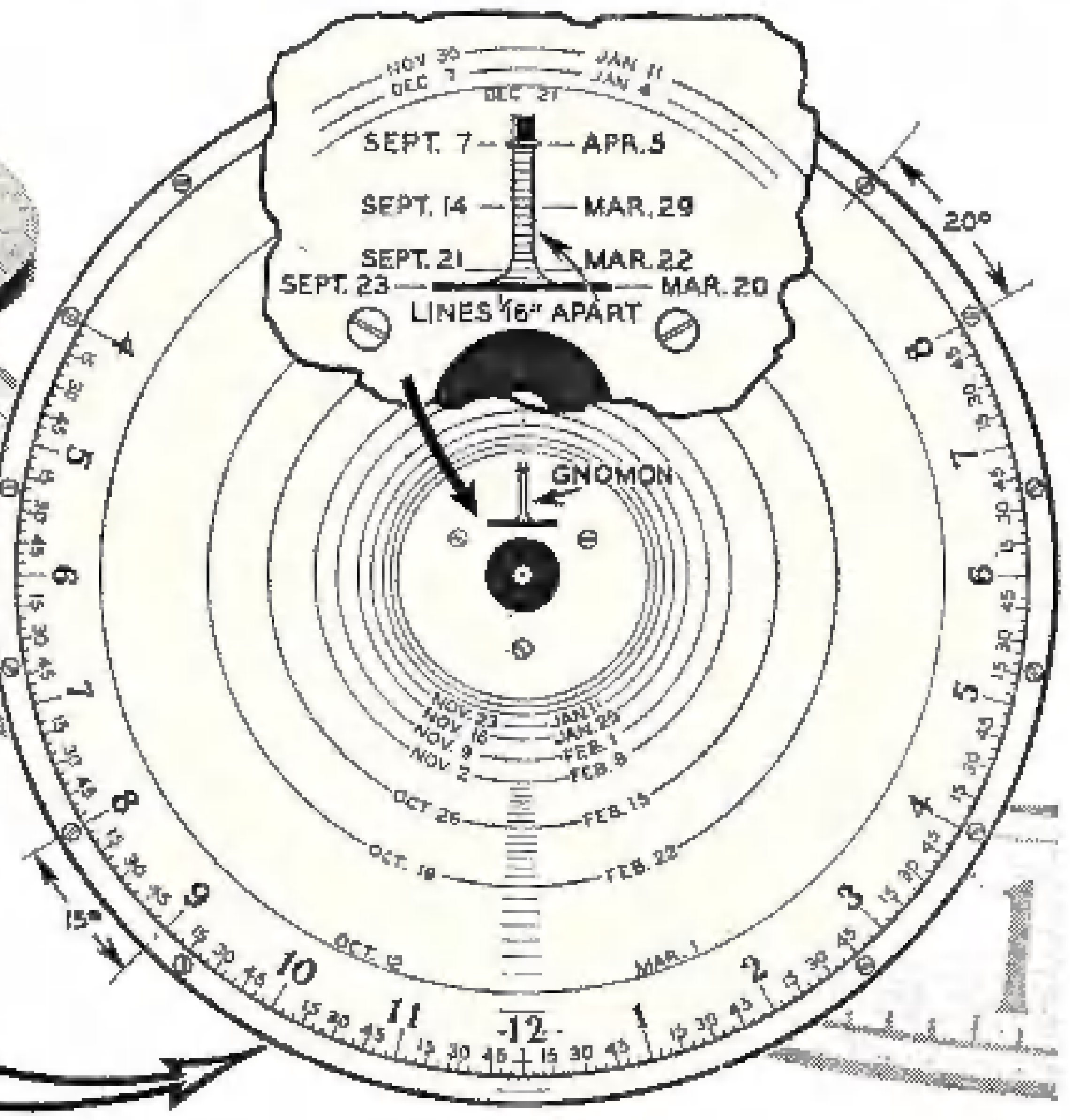
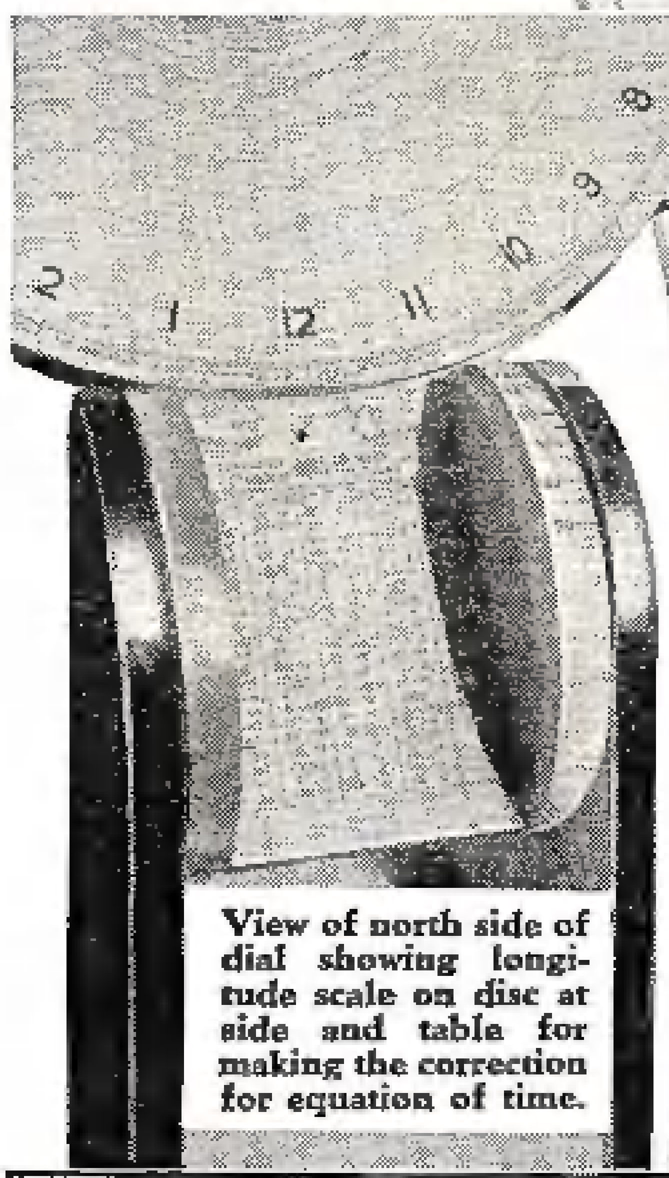

NOV. 30
DEC. 7
DEC. 21
JAN. 11
JAN. 4
SEPT. 7—APR. 5
SEPT. 14—MAR. 29
SEPT. 21—MAR. 22
SEPT. 23—MAR. 20
LINES 1/16" APART
GNOMON
20°
15°
NOV. 23
NOV. 16
NOV. 9
NOV. 2
JAN. 18
JAN. 25
FEB. 1
FEB. 8
OCT. 26
FEB. 15
OCT. 19
FEB. 22
OCT. 12
MAR. 1
4
5
6
7
8
9
10
11
12
1
2
3
4
5
6
7
8

Fig. 1. How figures are laid out. At right is seen layout of south side of the dial.

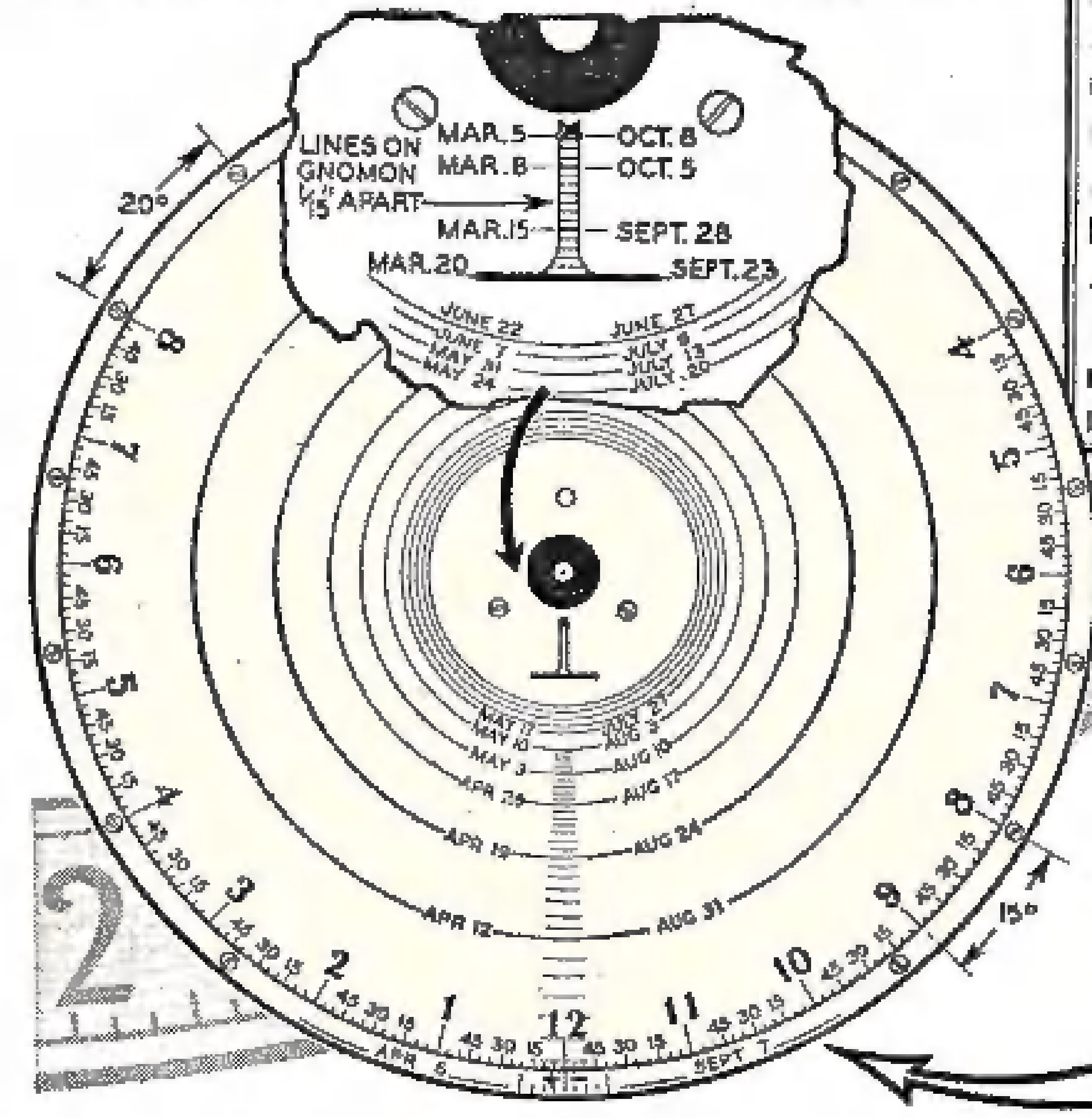


View of north side of dial showing longitude scale on disc at side and table for making the correction for equation of time.

TABLE FOR EQUATION OF TIME CORRECTION

JAN.		20	+8	15	0	13	−4	DEC.	
2	+4	23	+7	20	+1	16	−5	2	−11
4	+5	26	+6	24	+2	19	−6	4	−10
6	+6	29	+5	29	+3	22	−7	6	−9
9	+7	APR.		JULY		25	−8	9	−8
11	+8	1	+4	4	+4	28	−9	11	−7
14	+9	5	+3	10	+5	OCT.		13	−6
17	+10	8	+2	19	+6	1	−10	15	−5
20	+11	12	+1	27	+6	4	−11	17	−4
24	+12	16	0	AUG.		8	−12	19	−3
28	+13	20	−1	4	+6	11	−13	21	−2
FEB		25	−2	12	+5	15	−14	23	−1
3	+14	MAY		16	+4	20	−15	25	0
11	+14½	2	−3	22	+3	27	−16	27	+1
19	+14	6	−3½	26	+2	NOV.		29	+2
27	+13	16	−4	29	+1	3	−16½	31	+3
MAR		24	−3½	SEPT.		11	−16		
4	+12	29	−3	1	0	17	−15		
8	+11	JUNE		5	−1	22	−14		
12	+10	5	−2	8	−2	26	−13		
16	+9	10	−1	11	−3	29	−12		

Fig. 2. Adjust dial according to above table, which is painted on board between two circular wood pieces beneath dial.


LINES ON GNOMON 1/16" APART
MAR. 5—OCT. 8
MAR. 8—OCT. 5
MAR. 15—SEPT. 28
MAR. 20
SEPT. 23
JUNE 22
JUNE 27
JULY 3
20°
15°
APR. 19
AUG. 24
APR. 12
AUG. 31
APR. 6
SEPT. 7
8
7
6
5
4
3
2
1
12
11
10
9

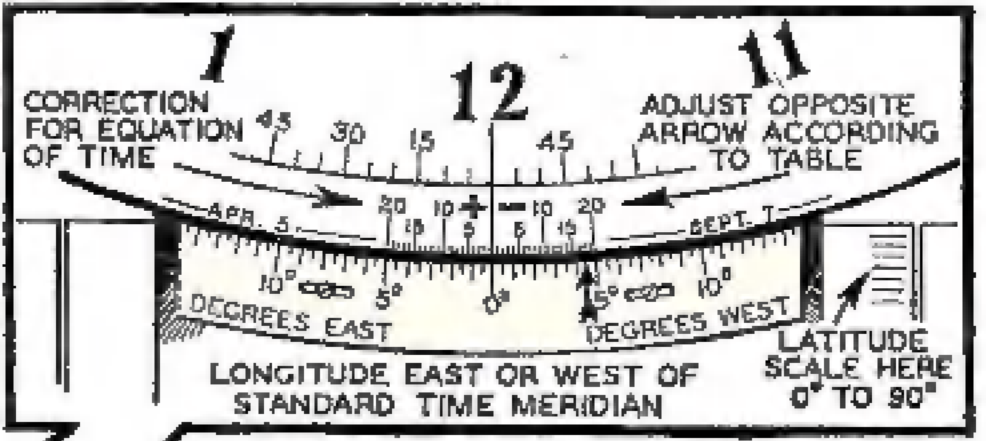
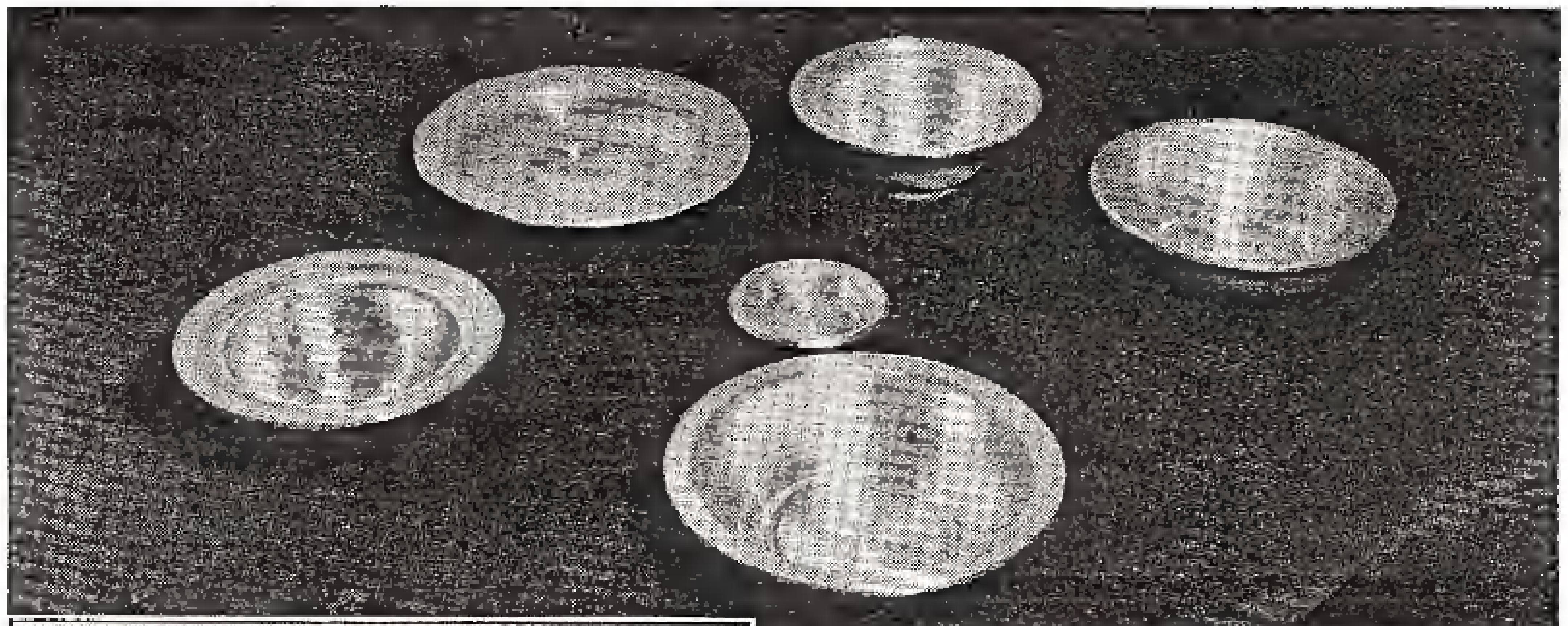

CORRECTION FOR EQUATION OF TIME
1
12
11
ADJUST OPPOSITE ARROW ACCORDING TO TABLE
45
30
15
APR. 5
SEPT. 7
DEGREES EAST
DEGREES WEST
LONGITUDE EAST OR WEST OF STANDARD TIME MERIDIAN
LATITUDE SCALE HERE 0° TO 90°

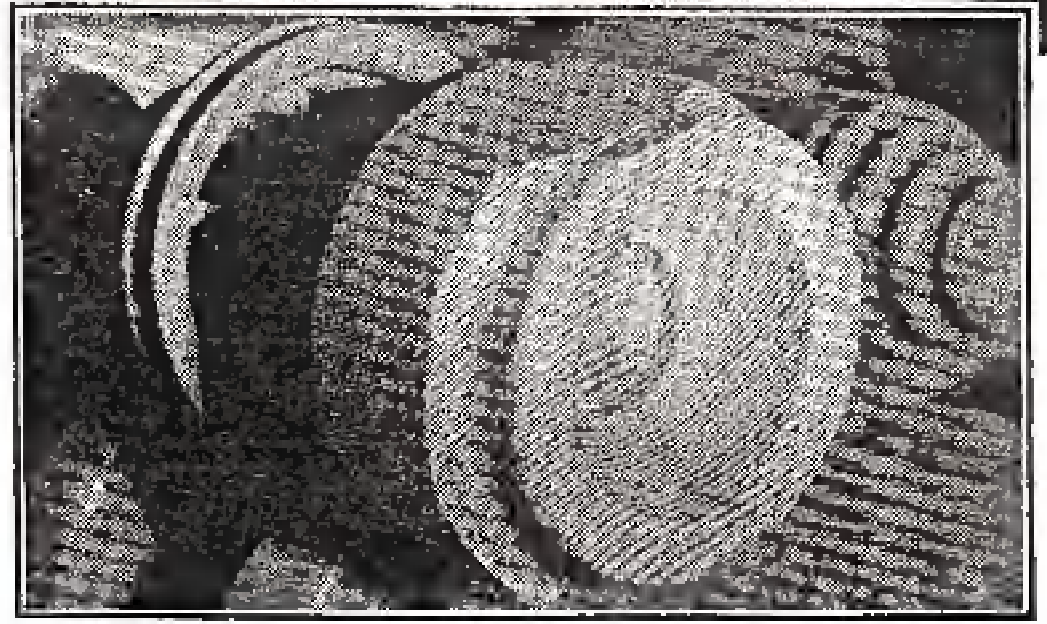
Fig. 3. North side of the dial. Above is seen scales for adjustment of longitude.

Spinning METAL Dishes on Your Wood Lathe

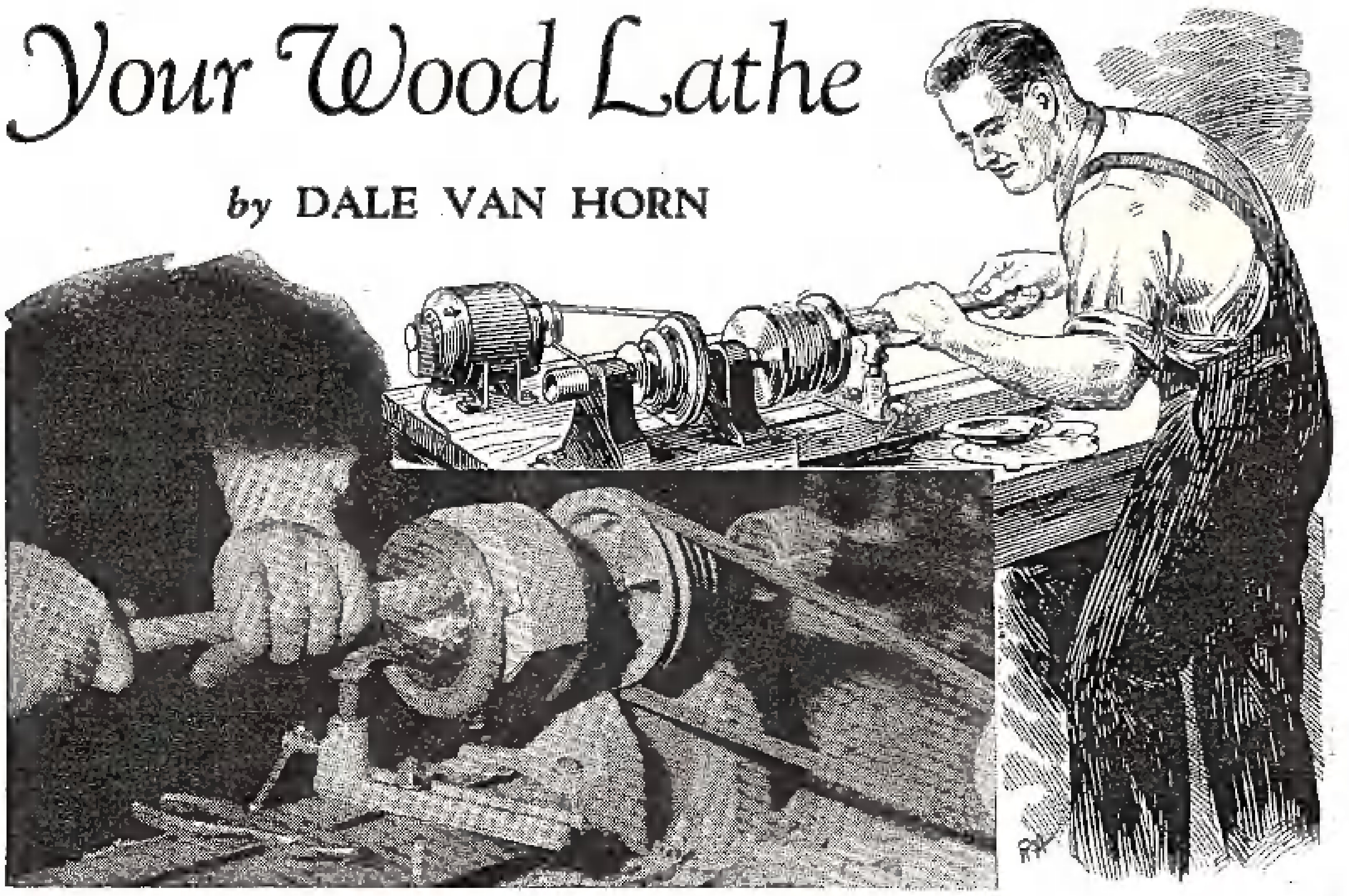
by DALE VAN HORN



Lead, copper or even galvanized sheet iron can be spun into unusual and original designs on the lathe by following Dale Van Hoen's instructions for spinning metal. When copper is turned it must be annealed by heating and plunging into water, the reverse process from annealing iron. These dishes are of a variety of metals, all made same way.



Almost any type of mold will do. Here is one 5 inches in diameter and about 3 inches deep. The outside does not have to be finished, but if the inside of the mold is cut smooth and then sanded it will give a smoother surface to the outside of the dish.



When the metal is nailed to the cup, a candle is rubbed from the edge to the center to lubricate the surface against digging and against too much heat. Then a round ended dowel of a chisel handle is pressed across the steady rest while the metal is whirling and a brightly recessed dish results.

MUCH the same appearance can be given copper or lead or brass or aluminum dishes of small size on your own woodworking lathe as are found in the commercially spun products.

Moreover the work is fun, unusual and sometimes profitable. You can take a sheet of any soft metal having some pliableness, add the speed of the lathe, and work this flat sheet into ornate and symmetrical designs. The process is unbelievably simple and quick. One or two ordinary wooden spindles of hardwood, rounded on the ends and a bit of candle are the only tools and materials needed.

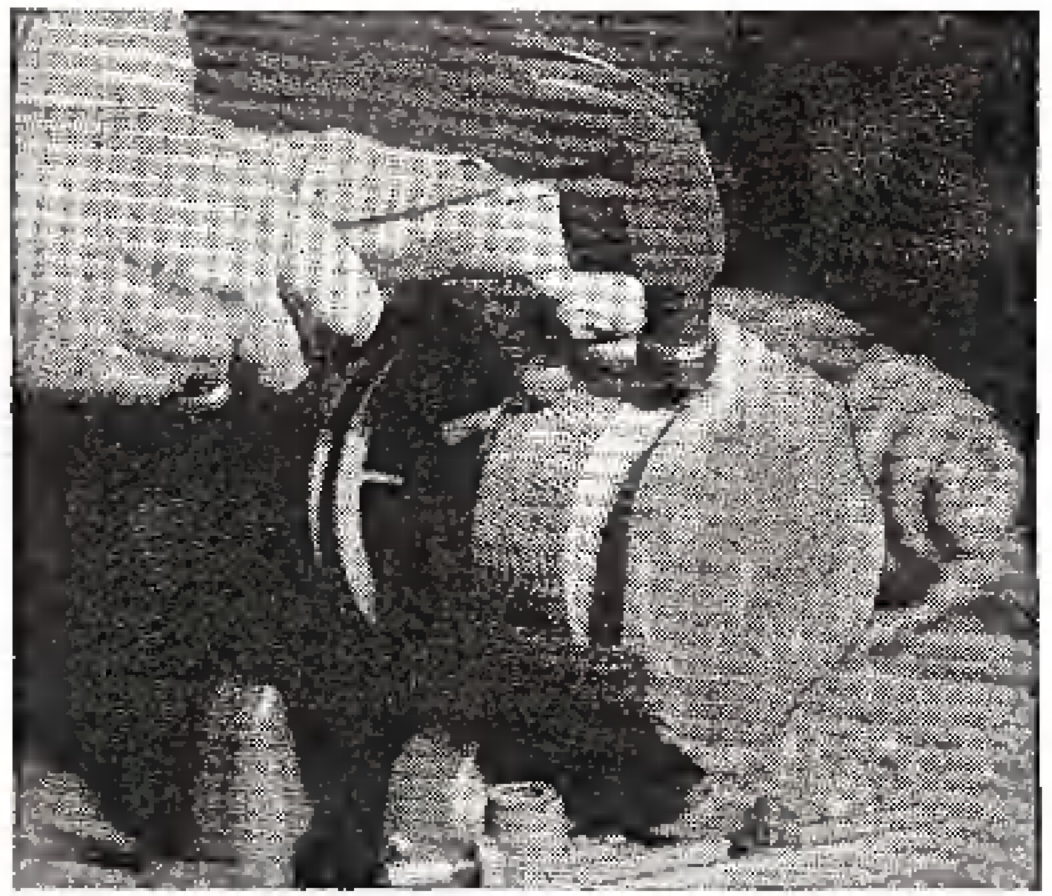
First there is the mold to make. This can be any size and shape. Mount a block of wood on the lathe face plate. Turn it down roughly round, then make a suitable matrix or concavity for your dish. If the piece is to be a shallow affair the depression should flare in slowly; if a deeper dish, more on the order of a bowl, then the concavity should match it.

Cut the depression with sharp tools to leave a smooth surface and then finish off with sandpaper. In any event, regardless of the shape of the piece to be spun, the bottom of the cut should have a flat spot at the center so the dish will set evenly and firmly.

Cut a disc of lead about 1/16" thick about 1" larger than the largest diameter of the mold, and at least four places on the rim leave slightly protruding ears as the accompanying photo shows. Small nails are later driven through these to hold the piece temporarily in place. Now lay this disc over the front of the mold, and fasten the piece by driving a small nail through each flap.

Start the lathe and rub a candle over the lead from edge to center to lubricate the surface.

Use a rounded chisel handle or other piece similar with a rounded, smoothed, hard end. A short half-inch diameter dowel with the ends rounded will also be useful. Or one end can be shaped flat and then slightly rounded to make indentations and to smooth out rough spots. Apply the candle several times for if the surface becomes barren of the wax, the stick may cut into the lead and the blemish is hard to erase.



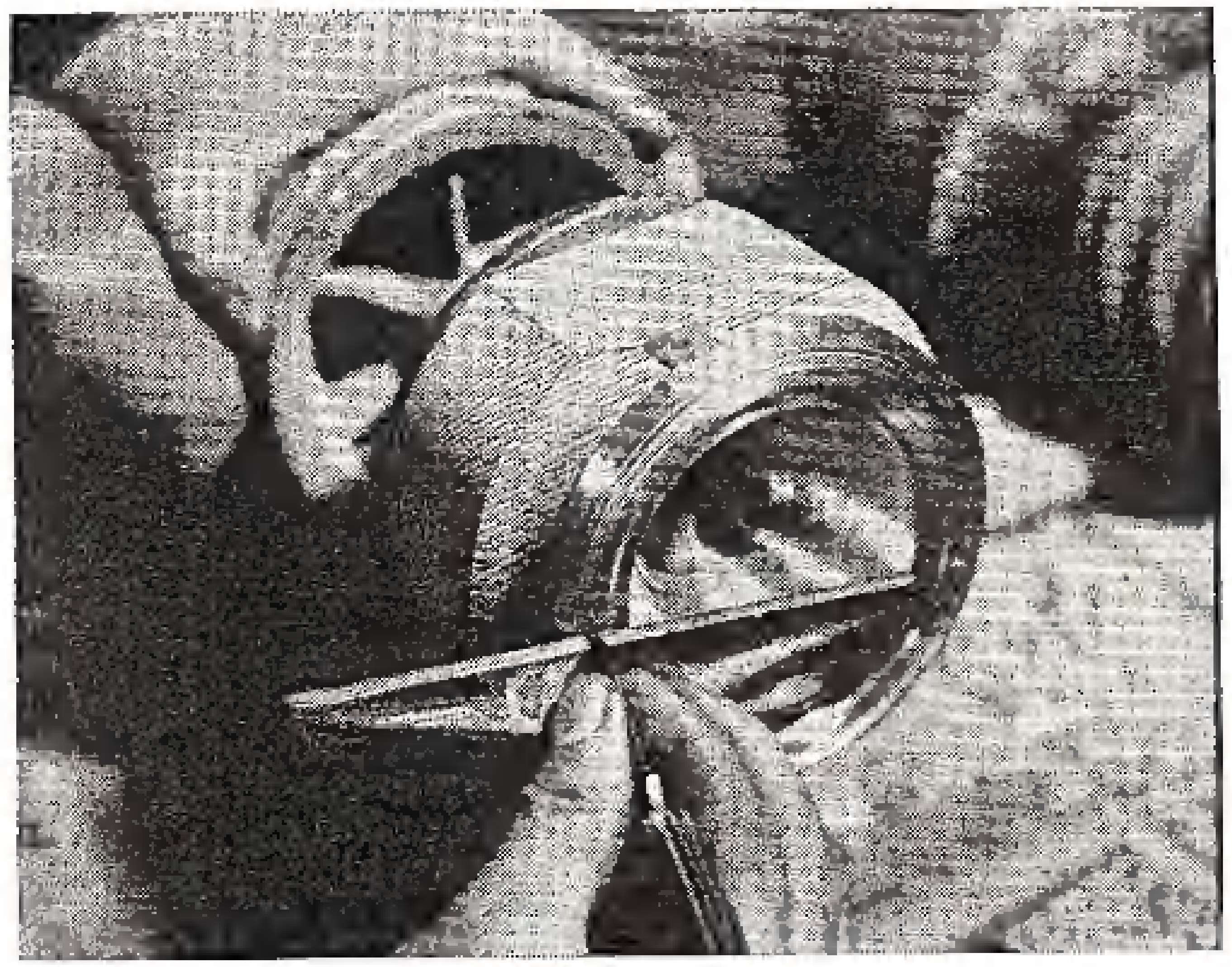
After the cup is turned the sheet to be turned is tacked on stoutly in at least four places. It is better to leave ears on the metal and turn them down this way.

After the lead has been pressed firmly against the side of the mold to conform exactly to shape, go over the lining again with a smoothed rounded stick. Use a back and forth motion to produce smoothness.

Finally rub with 000 sandpaper or 000 steel wool to remove the wax. Rubbing with a fine abrasive produces a bright shiny surface which can be preserved by next rubbing with a rag dipped in clear lacquer. To prevent muddying the surface the lathe should be stopped and the lacquer put on more slowly by hand.

The final step is to turn the live center slowly with one hand and hold the point of a knife against the lip of the lead dish with the other so that the right kind of rim is given to the vessel at the same time it is cut off.

The dish drops out, wholly finished and good looking. Copper was found to work well in this manner, though it must be annealed. This is done by heating it and plunging it in hot water—it will harden as you work it. Aluminum can be worked in this manner, but it must be of the soft variety. Aluminum comes in soft, hard and half hard alloys and sometimes variations of these will creep in if there is much silica in the metal in impure state. Only the soft variety can be used for spinning and it must be turned over quite a bit faster than copper. It can be spun with greater safety.

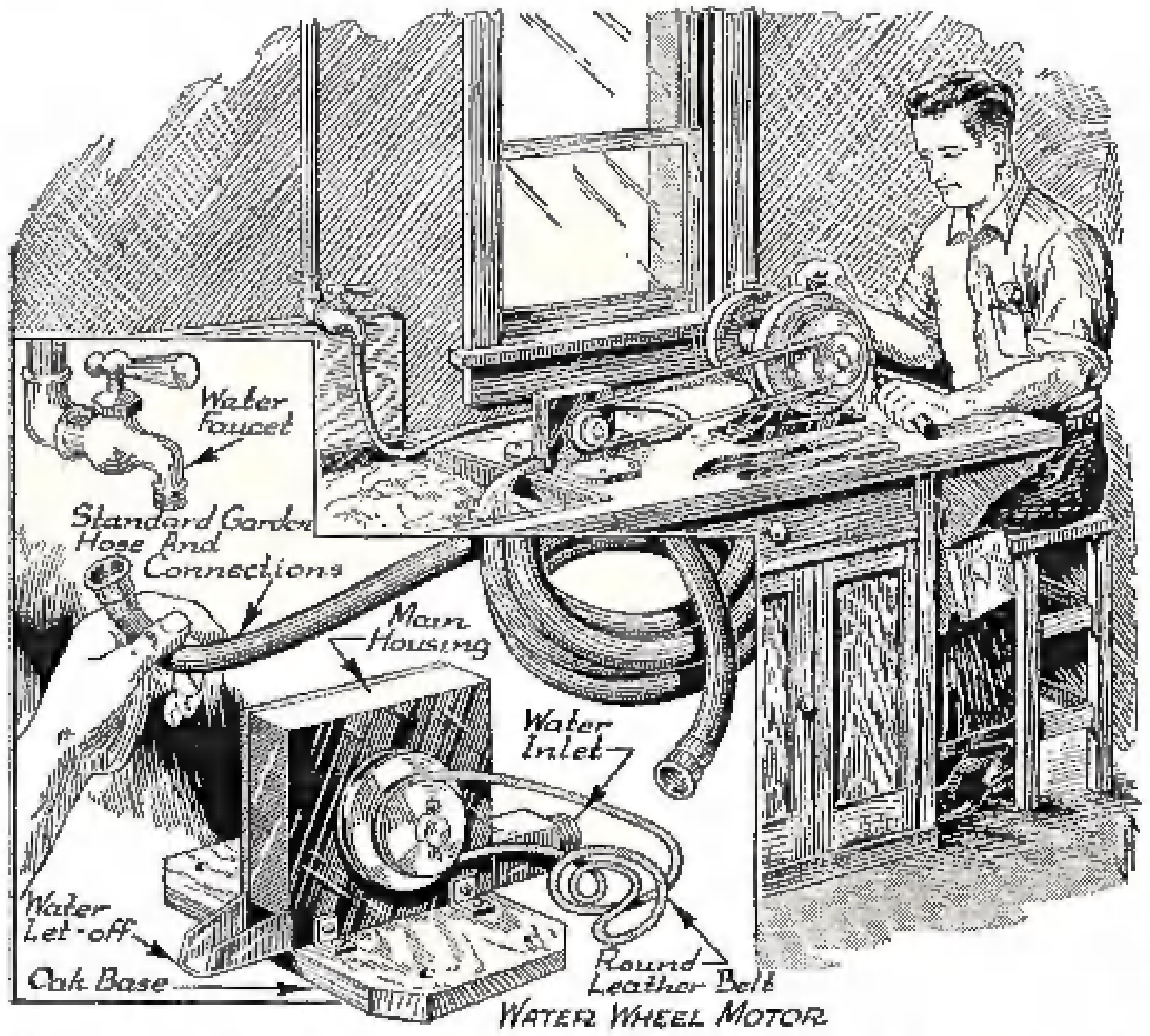


The dish is finished up by brightly and lightly burnishing with 000 sandpaper or steel wool to do away with the tallow of the candle. Then a knife point is brought across the rest to cut dish at rim.

One-fourth h.p. Water Motor

by

ORVILLE HICKMAN


Water Faucet
Standard Garden Hose And Connections
Main Housing
Water Inlet
Water Let-off
Oak Base
Round Leather Belt
WATER WHEEL MOTOR

Many communities have water power in abundance. It is in such places as these that a water motor shines as a prime mover. Here is shown a typical water wheel application, driven by a stream from the water tap.

WATER wheels are the earliest forms of prime movers and have always fascinated engineers. In today's usage water wheels have been almost entirely supplanted by turbines because of the greater efficiency. Water wheels are in general of three classes:

Overshot wheels, which receive the water and pass it over the top, and are of a diameter less than the total head of water; breast wheels, which receive the water on the upstream side and which pass it underneath being used for medium heads of water; and undershot wheels, which are rotated by the water passing below them and which are adapted to lowest heads.

Works From Tap Water

So in designing the water wheel here, realizing that many would want to build it for experimental uses and that the heads of water would vary a lot, I chose the undershot wheel with Poncelet type buckets as being the wheel which would work anywhere and even under rather high heads for so small a motor, say up to 60 lbs., which is tap water average pressure.

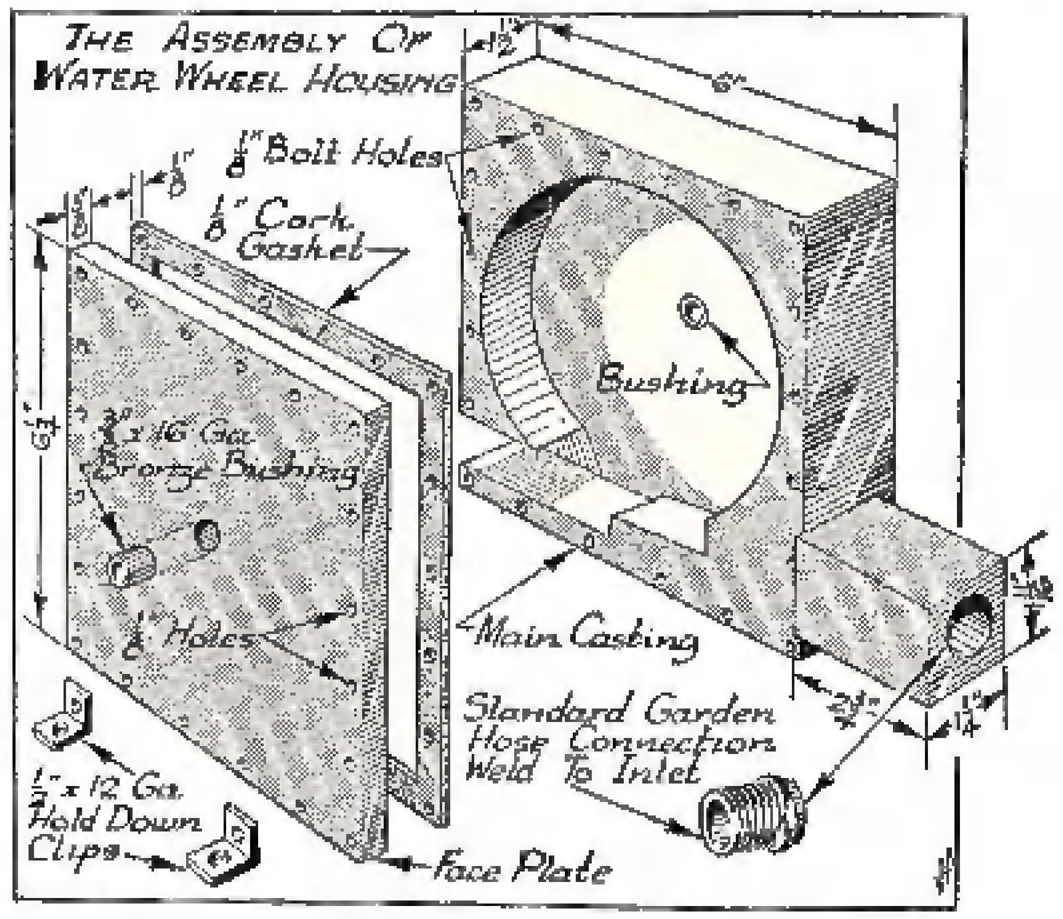
The first thing to do in building this wheel is to build the pattern for the box, that is, the main casting. It is best to cast this jacket of aluminum as it is easy to machine if turpentine is used on the cutting tool and it is the lightest of the metals which are available for this kind of work.

Care should be used in the making of this pattern as this is important to the success of the wheel. You can take the layout shown in the drawings and enlarge it by squares to final size to get the degree of annularity of orifice, etc.

The wheel is to be made of bronze. This requires a pattern also which can be made on a lathe. It should be about 1/16 larger than the original size so that there will be some leeway for machining.

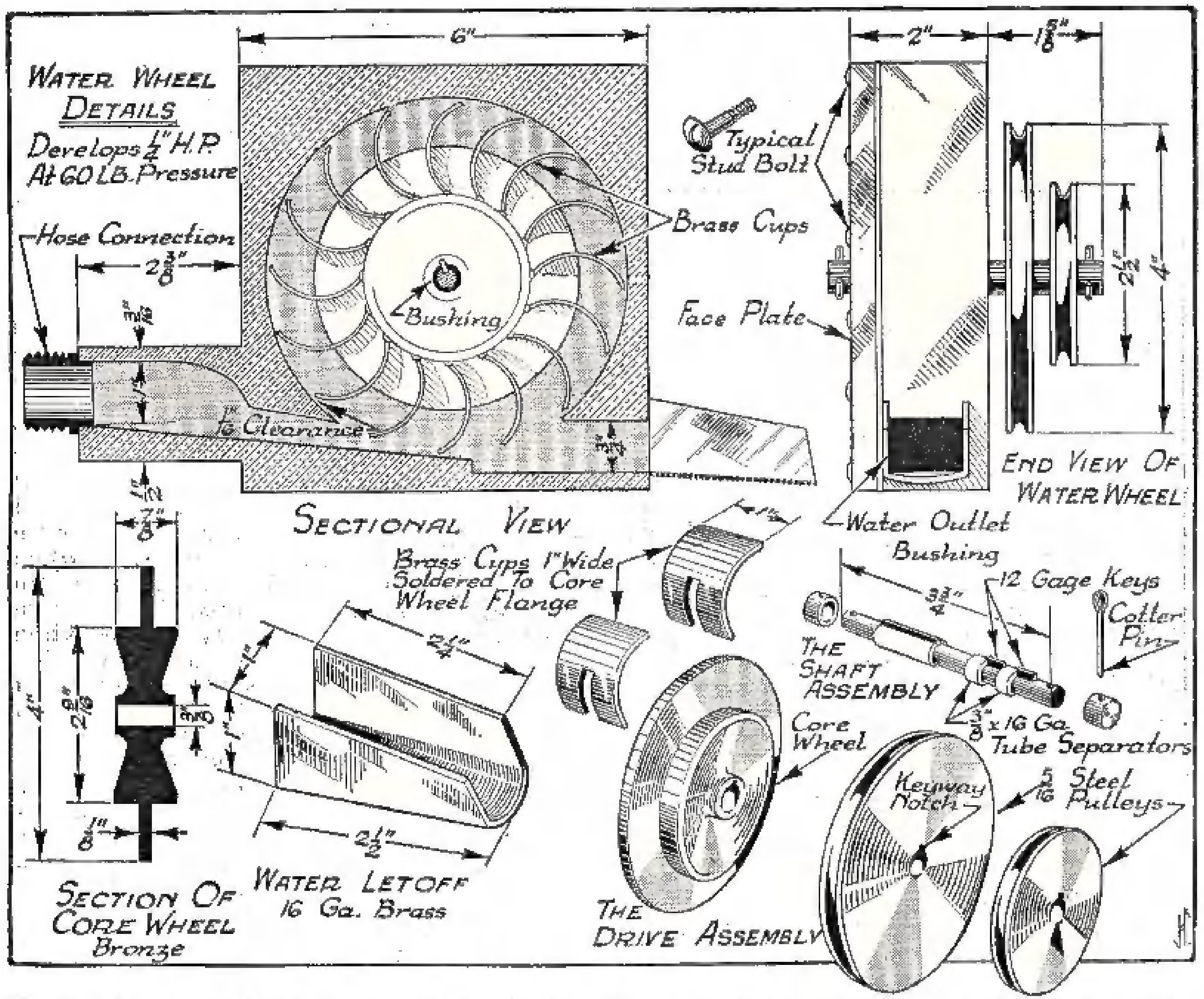
There is some question as to the correct amount of clearance between the wheel and the race, and a good rule to follow is the closer the better the efficiency. In laying the wheel out for the spacing of the buckets or cups, this must be done accurately or the wheel will not be in balance. Thus all of the work would be in vain, and the wheel would vibrate badly. In sawing the slots for the wheel there is a small hacksaw blade on the market which is available at most hardware stores that is about ¼" in depth that is just about the thing to use in cutting this curved groove in the casting. Machine the casting first and then cut the grooves in. The cups can be made out of sheet brass with a hard temper. Cut these all just the same and trim up neatly, curve to the desired shape and then insert in the wheel.

In soldering these cups be sure that you don't get too much solder on one cup, and not enough on the next or this will throw the wheel out of balance, too. After you have all the cups soldered in, and the shaft in the wheel, put it on a knife edge trunnion and balance up by adding solder until the light side is perfectly compensated. It should then stay in any place you put it.


THE ASSEMBLY OF WATER WHEEL HOUSING
1½"
6"
⅛" Bolt Holes
⅛" Cork Gasket
⅜"x16 Ga. Bronze Bushing
Bushing
⅛" Holes
Main Casting
Standard Garden Hose Connection Weld To Inlet
2¼"
1¼"
½"x12 Ga. Hold Down Clips
Face Plate

The water wheel which Hickman has designed is of very simple Poncelet type with a cast aluminum case and a sheet and gasket face which simplifies the job of building.

Poncelet Type Undershot Wheel of Simple Design Is 38% Efficient


WATER WHEEL DETAILS
Develops ¼ H.P. At 60 LB. Pressure
6"
Hose Connection
2⅜"
Bushing
Brass Cups
Typical Stud Bolt
Face Plate
1/16 Clearance
2"
1⅝"
2½"
4"
END VIEW OF WATER WHEEL
Water Outlet
Bushing
SECTIONAL VIEW
⅞"
Brass Cups 1" Wide Soldered To Core Wheel Flange
2¼"
4"
2⅛"
⅛"
SECTION OF CORE WHEEL Bronze
WATER LETOFF 16 Ga. Brass
12 Gage Keys
Cotter Pin
THE SHAFT ASSEMBLY
3¾"
Core Wheel
⅜"x16 Ga. Tube Separators
Keyway Notch
5/16 Steel Pulleys
THE DRIVE ASSEMBLY

The Poncelet type wheel with the curved buckets is about 38 per cent efficient. The water enters through the modified venturi orifice, fills each bucket up to a certain point and then scavenges itself on the upturn. The core wheel is of bronze so as to give weight to the rotor and to make it easy to solder the blades on. Power varies with the water pressure.

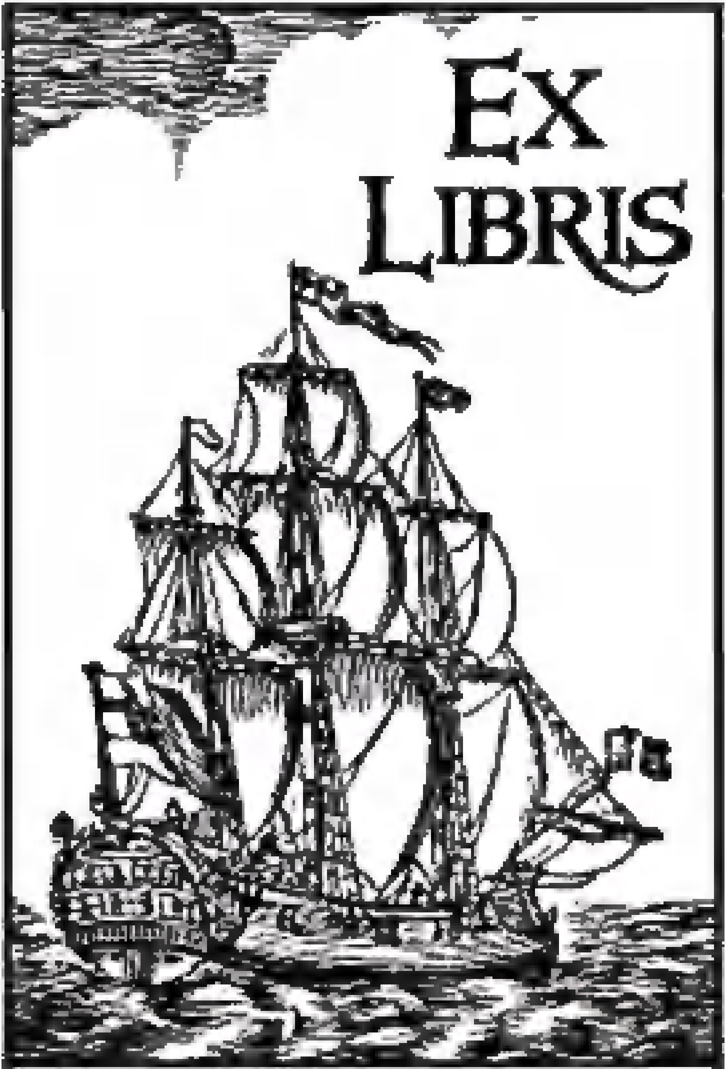
The shaft that we are using here may seem rather small to you but is all right. It is not any detriment to the wheel if you want to use a ⅝" shaft, the length has been left optional. In placing the shaft in the casting make it a press fit, or you can use a key in the shaft or a set screw.

The bearings that are used on the shaft are pressed into the case and will use very little oil, in fact there should be enough water there for lubrication. In machining the case you will have to have a lathe. First core out the race for the wheel after locating the center of the casting. The opening for the water inlet is bored next and the runway for the water is drilled in the back of the hold or the bottom. The best way is to drill two small holes and then saw between them. Then drill the outlet for the water.

The thread for the water connection is a standard 1" garden hose size and can be used with water hose as a connection between the water supply and the motor, then you can move the wheel around any place that you want.

One side of the case is open. You next make a cover for this open side. This is a flat casting ⅜" thick and the same outside dimensions as the main case. The bearing is located in this case just opposite the one in the main case, and is bolted to the main case with ⅛" stud bolts with a cork packing between the two. It is necessary that this packing be cut out the diameter of the wheel so it won't rub on the wheel. You can place any type of drive on the shaft—a pulley or a gear drive to whatever you want to use the wheel to power.

Assemble the wheel now and see that it runs freely in the bearings before you connect it up with the water supply. Another thing that you want to take care of is the water that passes through the wheel. It is best to operate in the sink or any other means that will take care of the used water. Of course, the more pressure, the more speed and power that you can get. Follow the plans carefully and you will have a very powerful motor that will give lots of fun and work.



Anon. Malefactor